• ANNUAL REPORT 1963

SIXTY-EIGHTH ANNUAL REPORT

1963

THE SOCIETY'S OFFICES
630 FIFTH AVENUE, NEW YORK 10020

THE ZOOLOGICAL PARK
BRONX PARK, BRONX 10460

THE AQUARIUM
CONEY ISLAND, BROOKLYN 11224

Recipients of the Gold Medal of the New York Zoological Society

FREDERIC C. WALCOTT
Humanitarian, conservationist, vigilant defender of the living things of this earth. January 8, 1946.

RACHEL CARSON
Interpreter of the oceans. January 15, 1953.

ROBERT M. YERKES
Eminent pioneer in Psychobiology. January 26, 1954.

KONRAD LORENZ
Eminent interpreter of the behavior of animals. January 25, 1955.

JACQUES-YVES COUSTEAU
For your inspired accomplishments in advancing knowledge of life within the oceans. January 7, 1960.

ROGER TORY PETERSON
Inspired interpreter of birds for the benefit of man. January 9, 1961.

BERNHARD GRZIMEK
For the outstanding leadership of Bernhard and his son Michael in wildlife protection. January 10, 1963.

THE ZOOLOGICAL SOCIETY IN 1963

FAIRFIELD OSBORN, *President*

THE YEAR HAS been marked by a number of favorable developments, all of which are bound to prove of large importance in advancing the Society's work. Any one of these developments would be significant in itself. Taken together, they bring into brighter focus the unusual values of the Society's activities and present a challenge for greater accomplishments in the years that lie ahead.

One particularly encouraging aspect of the year is that the Society's work is receiving ever-wider recognition. Proof of this lies in the generous contributions to the Development Fund received from many different sources, as well as in the steady and continuing increase in the number of our Members.

Other highlights of the year are the extensive program of improvements in the form of new buildings and exhibits now being carried forward at both the Zoological Park and the Aquarium; the notable progress in scientific work being made by the Departments of Marine Biochemistry & Ecology and Tropical Research; the decision to establish a new department to be known as the Department of Behavioral Sciences at the Zoological Park; the continuance of work in wildlife protection, especially in regard to the crisis facing wild animals in East Africa, and, finally, the adoption of new educational techniques at the Zoological Park and the Aquarium.

DEVELOPMENT FUND

During the year, the Development Fund received $1,284,940 in cash contributions or firm pledges from individuals and foundations. In addition there was received, towards the close of the year, a bequest of approximately $1,500,000 from the estate of a former member, Mr. Elmer Otto, a substantial amount of which, we are informed by the trustees of the estate, will be paid to the Society during 1964 and the balance during the succeeding year. The total of contributions from sources other than the City government now stands at $5,058,000, or a little more than half way towards the campaign's goal of $10,000,000.

MEMBERSHIP

The number of Members during the year has increased to 4,592,

a new high figure. The classes of Supporting and Contributing Memberships with annual dues of $100 and $25 respectively, established in recent years, have been steadily growing. Aggregate dues now exceed $86,000, a valuable addition to our current income.

Zoological Park

The staff of the Zoological Park is engaged in the largest physical development and modernization program that has ever been undertaken there at any one time. The Government of the City of New York has given its full endorsement of the plans, which call for the construction of new buildings and exhibits, and is aiding with funds to meet design costs. This cooperation by the City is deeply appreciated and we look forward to the City's joining with the Society on a matching basis in providing funds to meet construction costs as these are called for. The over-all program envisages expenditures within the next several years of an aggregate amount of more than $4,500,000. The program is adopting distinctive and, to some degree, radical new methods in the exhibition of wild animals. The concepts involved are designed to interpret wild animal life in relationship to its existence in nature. The purpose of this approach is to throw light upon the evolution of animal life, its adaptation to its environment and the interrelations of various animal societies. We believe these methods will have consequences not only leading to a better understanding of animal life upon this earth, its nature and kind, but even suggesting the natural influences that play upon the existence of all living things. (Director's report, page 10).

Aquarium

The staff at the Aquarium is preparing plans for a new addition to be known as the Shark Hall. This will be featured by large tanks capable of exhibiting sharks and other big ocean fishes. Plans are also being completed for the new Marine Biological Laboratory adjacent to the Aquarium, construction of which we now expect to commence next year. (Director's report, page 42).

Scientific Research

Increasing financial support for scientific purposes is being acquired and consequently the number of research programs is increasing steadily. Important among these is the expansion of work in the Department of Marine Biochemistry & Ecology. (Director's report, page 52). It should be noted that this field of inquiry into pharmacologically active compounds derived from marine organisms is one of particular promise, related as it is to the discovery of new drugs that may prove

useful in the treatment and prevention of infectious and non-infectious diseases.

Plans have crystallized during the year for the establishment of a new department at the Zoological Park to be known as the Department of Behavioral Sciences. It has long been evident that the extent and diversity of the living collections at the Zoo offer unusual opportunities for investigating comparative problems in developmental behavior and the evolution of behavior. Within the framework of behavioral studies related research can be carried out in physiology, hormonal control, inbreeding, vertebrate genetics, comparative infant and parent relationships, development of behavioral controls and even breakdown and senescence. Research based on a great zoological collection can and should be an invaluable complement to field studies. We look forward to the initiation of this program during the coming year.

The values of the Tropical Research Department, founded by the late Dr. William Beebe in 1916, are increasing as the years go by. Its field station on the island of Trinidad more than justifies the selection of this site by its founder, who, it should be recalled, purchased the property with his own funds and subsequently gave it to the Society. The environment in which the laboratory is located and the richness of its fauna lend themselves admirably to many types of research in tropical life. As a consequence there is steady increase in the number of scientists from both this country and abroad who are seeking the opportunity of working there. As of this writing the facilities for the coming year are "booked full." The report of the Director will be found on page 60.

Wild Life Protection

The crisis facing wild animals in virtually every part of the world is increasing rather than diminishing. There are several main reasons for this deplorable situation, such as illegal shooting and poaching for food, hides, ivory and other animal products, and various lesser causes, some of more recent origin, among them the large scale capture of different species of monkeys for medical research, and illegal export of rare animals, such as the Orang-utan, for zoos. In many countries there is despoliation of land by grazing of domestic cattle and goats, as well as deforestation. The root cause, however, is the extremely rapid rise in the numbers of people. This population increase inevitably results in the invasion of natural areas where wild animals live. This is occurring not only in Africa, Asia and South America, but, in another form, is increasingly prevalent even in our own country where

not only wilderness areas are being lost, but even many of the primeval characteristics of our National Parks are being impaired. Nevertheless, there is little question now but that in many parts of the world the establishment of National Parks under governmental guardianship is the principal means of perpetuating many forms of wild animal life.

With this in mind, the Society has been extending aid to the National Parks in East Africa. In addition, the Society is aiding programs to educate Africans in the values of wild life, supporting field studies to promote better methods of wild life management, providing funds for planes to control poaching and for new water sources for wild life, and for other useful purposes.

Generally speaking, the position of wild life in the United States is reasonably secure, with some exceptions including the threatened disappearance of the large predators—the Grizzly Bear, the Wolf, and the Mountain Lion. In an effort to gain better knowledge concerning this situation there has now been completed, under the joint sponsorship of the Society and the Boone and Crockett Club, an initial survey of the status of these predators in the North American continent, directed by the experienced mammalogist, Dr. Victor Cahalane. Fortunately, other conservation organizations are working on this problem so that it can be hoped that far greater protection of these remarkable animals may result. The Society intends to continue its work in their behalf.

Financial Reports

Attention is called to the fact that the Society's financial reports are now presented in a more simplified and condensed form than in previous years. This is done with the hope that it will lead to a clearer understanding of the scope of the Society's finances, the sources of its income and the identification of its expenditures.

Trustees and Staff

It is a pleasure to welcome Charles W. Engelhard and John N. Irwin, II, to membership on the Board of Trustees.

It is also a pleasure to welcome Paul Montreuil to the position of Curator of the Aquarium, Joseph Bell to the position of Assistant Curator of Birds at the Zoological Park and Jerry M. Johnson to the position of Designer, Department of Exhibition.

* * *

The gratitude of the Society goes to all the individuals, foundations and other organizations who have contributed to the General Development Fund. The members of the Board of Trustees have played

an important part in the success attained so far. Special mention should be made of the generous action of Laurance S. Rockefeller who, at the initiation of the campaign, pledged himself to give one-third of the total amount given by the members of the Board as a whole. The success attained by our campaign so far is extremely heartening.

In regard to gifts received from all sources, the amount of any single gift has ranged from $1.25 to more than $500,000. In other words, "each according to his means," but all inspired by recognition of the values of the Society's work.

In summary, at this time the campaign has reached the figure of $5,058,000, or slightly more than half-way to its goal of $10,000,000. Only by attaining this goal can the Society truly meet the opportunities for service and accomplishment that lie before it.

THE ZOOLOGICAL PARK

THE DIRECTOR'S REPORT

William G. Conway, *Director*

Planning and development have characterized 1963. Nearly half of our first-stage development program has been pushed through a trying infancy of preliminary plans and budgets toward an adolescence of final drawings and approvals. Our first major exhibit building in many years, the Aquatic Birds Building, will be opened in 1964. A host of minor projects have been completed. The living collection has been enhanced by the maturation of a policy of exhibition announced last year: more emphasis on self-replacing breeding herds, inevitably of fewer species rather than on a larger variety of species represented by single individuals. Of especial significance was the creation of a Department of Exhibition, one of the first in a zoo. Attendance was excellent. Altogether, the year has been a rewarding one of increased activity and increased improvements—nor have our needs diminished.

The necessity of closer attention to the management of breeding wild animals in captivity has already led to greater formalization of care and dietary techniques in most zoos and even to the formation of a special committee in our own Zoo. But experience has taught us that successful breeding and care programs require a constancy of surveillance which our very limited supervisory and scientific staff is hard-pressed to provide. An enlarged curatorial staff is a primary requirement. Nevertheless, our wild animal breeding program has produced results of which we feel we may be rightfully proud. The best illustration of our success is the species list of mammals, birds and reptiles born or hatched at the park in 1962 and 1963:

Mammals

Agile Wallaby—*Protemnodon agilis*
Silvered Leaf Monkey—*Presbytis cristatus cristatus*
Uele Colobus Monkey—*Colobus polykomos uellensis*
Wanderoo—*Macaca silenus*
Japanese Macaque—*Macaca fuscata yakui*
Mandrill—*Mandrillus sphinx*
Gelada Baboon—*Theropithecus gelada*
White-handed Gibbon—*Hylobates lar lar*
Mongolian Gerbil—*Meriones unguiculatus*

Palestine Spiny Mouse—*Acomys cahirinus dimidiatus*
Southern Grasshopper Mouse—*Onychomys torridus torridus*
Prevost's Squirrel—*Callosciurus prevosti*
Chinchilla—*Chinchilla laniger*
Paraguayan Agouti—*Dasyprocta paraguayensis*
Dingo—*Canis dingo*
Kit Fox—*Vulpes macrotis neomexicana*
Bush Dog—*Speothos venaticus*
Eastern Raccoon—*Procyon lotor lotor*
Kinkajou—*Potos flavus*
Ferret—*Mustela putorius*
American Marten—*Martes americana actuosa*
Cusimanse—*Crossarchus obscurus*
African Palm Civet—*Nandinia binotata*
Lion—*Panthera leo*
California Sea Lion—*Zalophus californianus*
Grant's Zebra—*Equus burchellii bohmi*
Nile Hippopotamus—*Hippopotamus amphibius*
Pigmy Hippopotamus—*Choeropsis liberiensis*
Dromedary—*Camelus dromedarius*
Llama—*Lama glama*
Small Malayan Mouse-deer—*Tragulus javanicus*
Reeves's Muntjac—*Muntiacus reevesi*
Indian Sambar Deer—*Cervus unicolor unicolor*
Japanese Sika Deer—*Cervus nippon nippon*
Formosan Sika Deer—*Cervus nippon taiouanus*
Dybowski's Deer—*Cervus nippon hortulorum*
Barasingha Deer—*Cervus duvauceli*
Roosevelt's Elk—*Cervus canadensis roosevelti*
Red Deer—*Cervus elaphus*
Axis Deer—*Axis axis*
Chinese Water Deer—*Hydropotes inermis*
Masai Giraffe—*Giraffa camelopardalis tippelskirchi*
Okapi—*Okapia johnstoni*
Nyala—*Tragelaphus angasi*
White-tailed Gnu—*Connochaetes gnou*
Gerenuk—*Litocranius walleri sclateri*
Blackbuck—*Antilope cervicapra*
Thomson's Gazelle—*Gazella thomsoni*
Mouflon—*Ovis musimon*
Siberian Ibex—*Capra sibirica sibirica*
Aoudad—*Ammotragus lervia*
Himalayan Tahr—*Hemitragus jemlahicus*
Wisent—*Bison bonasus bonasus*
Bison—*Bison bison bison*
Gayal—*Bibos frontalis*
Yak—*Poephagus grunniens*

BIRDS

Humboldt's Penguin—*Spheniscus humboldti*
Zabele's Red-footed Tinamou—*Crypturellus noctivagus zabele*
Tataupa Tinamou—*Microcrypturus tataupa tataupa*
Eastern Canada Goose—*Branta canadensis canadensis*

Western Gray-lag Goose—*Anser anser anser*
Bar-headed Goose—*Anser indicus*
Black-necked Swan—*Olor melanocoryphus*
Ashy-headed Upland Goose—*Chloephaga poliocephala*
Lesser Magellan Upland Goose—*Chloephaga picta picta*
Egyptian Goose—*Alopochen aegyptiacus*
European Shelduck—*Tadorna tadorna*
Mallard Duck—*Anas platyrhynchos platyrhynchos*
Laysan Teal—*Anas platyrhynchos laysanensis*
Australian Gray Duck—*Anas superciliosa rogersi*
Chestnut-breasted Teal—*Anas castanea*
Falcated Teal—*Anas falcata*
Chiloe Widgeon—*Anas sibilatrix*
Southern Bahama Pintail—*Anas bahamensis rubirostris*
Chilean Pintail—*Anas georgica spinicauda*
Cape Teal—*Anas capensis*
Prairie Blue-winged Teal—*Anas discors*
Ringed Teal—*Anas leucophrys*
Red-crested Pochard—*Netta rufina*
Rosy-billed Duck—*Netta peposaca*
Redhead—*Aythya americana*
White-eyed Duck—*Aythya nyroca*
Tufted Duck—*Aythya fuligula*
Lesser Scaup—*Aythya affinis*
Lesser Brazilian Teal—*Amazonetta brasiliensis brasiliensis*
Mandarin Duck—*Aix galericulata*
Wood Duck—*Aix sponsa*
Barrow's Golden-eye—*Bucephala islandica*
Barbary Partridge—*Alectoris barbara barbara*
Harlequin Quail—*Coturnix delegorguei delegorguei*
Crested Wood Partridge—*Rollulus roulroul*
Chinese Bamboo Partridge—*Bambusicola thoracica thoracica*
Satyr Tragopan—*Tragopan satyra*
Scintillating Copper Pheasant—*Syrmaticus soemmerringii scintillans*
Golden Pheasant—*Chrysolophus pictus*
Common Peacock Pheasant—*Polyplectron bicalcaratum bicalcaratum*
Wattled Crane—*Bugeranus carunculatus*
American Coot—*Fulica americana americana*
Killdeer—*Charadrius vociferus vociferus*
Oriental Pratincole—*Glareola maldivarum*
Laughing Gull—*Larus atricilla*
Triangular-spotted Pigeon—*Columba guinea guinea*
Galapagos Dove—*Nesopelia galapagoensis galapagoensis*
Superb Glossy Starling—*Spreo superbus*
Gouldian Finch—*Poephila gouldiae gouldiae*
Brewer's Blackbird—*Euphagus cyanocephalus*

Reptiles

Reeves Turtle—*Chinemys reevesi*
Tokay Gecko—*Gekko gecko*
Gray Tree Boa—*Corallus enydris*
Anaconda—*Eunectes notaeus* × *E. murinus*
Madagascan Boa—*Sanzinia madagascarensis*

Eastern Hognose Snake—*Heterodon platyrhinos*
Eastern Gartersnake—*Thamnophis sirtalis*
Black Ratsnake—*Elaphe obsoleta obsoleta*
Japanese Ladderback—*Elaphe climacophora*
Asiatic Cobra—*Naja naja*
Diamondback Rattlesnake—*Crotalus adamanteus*
Black-tailed Rattlesnake—*Crotalus molossus*
Timber Rattlesnake—*Crotalus horridus horridus*

On December 31 the Zoological Park exhibited 2,737 specimens of 1,076 species. However, during 1964 and 1965 the bird collection will be diminished sharply in order to reduce housing problems during the scheduled demolition of the Main Bird House. The old building will be replaced by a new structure called the "World of Birds" in the Zoo's future development plans.

Especially important in establishing details in our development plans was a month-long trip through European zoos undertaken during the summer by the Director. While the staff's acquaintance with other zoos is broad, and the seventeen visited on this trip brought Mr. Conway's own total to seventy, the Director's tour impressed him with the high quality of exhibition at several European zoological parks with which he was previously unacquainted. The trip not only provided opportunities to view different approaches to common zoo problems, but it also increased an awareness of our opportunities and enhanced a determination to further improve our collection's quality. (See "A Zoo Man's Tour of Europe," *Animal Kingdom,* Vol. 66, No. 6, 1963, and Vol. 67, No. 1, 1964).

In February Mr. Conway attended the mid-winter meeting of the American Association of Zoological Parks and Aquariums in Texas, where he presented two papers and visited three zoos.

During the past year we have continued to press forward with several major programs of repair, renovation and new construction, programs that should act as long steps toward providing the best of zoos anywhere. These developments, which are being prosecuted with the aid of the Department of Parks and the approval of the Planning Commission, the Bureau of the Budget, the Board of Estimate, the City Council and the Mayor, have been outlined in previous *Annual Reports* (1961, 1962) and in *Animal Kingdom* ("Our Next Stage of Animal Exhibition," Vol. 66, No. 2, 1963). While all staff members have participated in the development of plans for new exhibits, Mr. Driscoll and Mr. Davis have played a major part in aiding the Director in this work. The most interesting projects, and their current status, are:

World of Darkness—Final drawings and specifications in process.

Alaskan Brown and Polar Bear Exhibits—Final drawings and specifications in process.

World of Birds—Final drawings and specifications in process.

Africa—Preliminary planning in process.

South America—Preliminary planning in process.

Wildlife Survival Center—Stage I planning underway.

Aquatic Birds Building—Construction nearing completion.

Eagles and Vultures Aviary Renovation—Preliminary plans in process.

Australia—Preliminary plans in process.

Pheasant Aviary Renovation—Preliminary plans in process.

Lake Agassiz Bison Range—Preliminary plans in process.

The Farm-in-the-Zoo was closed at the end of its sixteenth season in order to make way for the forthcoming Wildlife Survival Center and to enable us to comply more strictly with recent Federal regulations concerning hoofed animals. Gradually, as the Children's Zoo is renovated, certain of the more successful Farm exhibits will be incorporated in the former. Though not without interest, the Farm attracted comparatively few visitors (annually it averaged about 89,000 as compared to the Children's Zoo's attendance of more than 300,000). Incorporation of more Farm animals at the Children's Zoo will make these exhibits available to more visitors, while the seclusion of the Farm's site lends itself to the important work of the Survival Center—work necessary to meet new preservation and educational needs and even to insure the continuance of certain exhibits at the Zoo itself.

The construction of exhibits by our own work force has gone on at a variable pace ever since the Zoo's inception, but today the increased efforts of Superintendant of Operations Charles Driscoll and his assistants, Mr. George Russell and Mr. Louis Sanders, have led to a remarkable series of "do-it-yourself" projects. The services of new mechanical equipment have been invaluable. Chief among new exhibits executed during 1963 were a Wisent range in a fine sylvan setting, a bird exhibit called the South American Llanos (replacing the old duck and goose paddocks) and an elevated bridge through the Great Flying Cage that permits visitors to walk among the birds. The cage and its viewing bridge have been re-christened "Bird Walk."

None of these home-grown projects, not to mention many needed repairs, could be accomplished but for the income from Park facilities and gate admissions. This income, which is also our sole source of funds for animal purchases, has been increasingly challenged by rising

costs, particularly increased labor expenses. A major renovation of the Zoobar restaurant was undertaken during the year with this problem very much in mind, for the Zoobar, a waitress-service restaurant employing much personnel, had been an expensive operation for some years. The new "Zoo Terrace Buffet" will be a serve-yourself restaurant more responsive to fluctuations in weather and attendance and from it we expect to derive good income for Zoo improvements.

Zoo improvements of a special kind were one of the chief subjects of the Director's *Annual Report* of 1961. There the hope was voiced that a Department of Exhibition "capable of preparing illustrative and educational material and special exhibits and natural habitat displays to aid the curators" might be established. During 1963 we created the first such department in an American zoo. Exhibition Departments are so essential to the existence of our sister institutions, the natural history museums, that it seems curious that they are not more generally developed in zoos. Our new department was fortunate in enlisting the services of Mr. Jerry Johnson as its head and all new Zoo signs and designs should be aided by his scrutiny. During 1963 Mr. Johnson, with the help of the Construction Department, worked with the curators to design and execute a number of graphic displays and a gigantic fiberglass cliff for the Aquatic Birds Building.

The new department will especially devote its efforts to improving the esthetics of the zoo. We suffer from a disparity in sign types, from occasional lapses in the appropriateness of exhibit colors and from the lack of a single hand acting to achieve an over-all cohesiveness in the constant and necessary stream of products of home-made design. While the curators must retain basic responsibility for the continual improvements in their departmental exhibits, their basic duties to the collections allow little time for esthetic experimentation and development. Nevertheless, the evidence is overwhelming that the displays —the stage settings which we provide for our living creatures—are almost as important to the visitor's impression as the creatures themselves. Our problem is, after all, how to affect people—to grasp their interest. Only then may we teach them. A beautiful creature whose appeal is destroyed by ugly cage surroundings is an all too common picture of wild animals in some zoo exhibits.

Our first collective bargaining agreement with Local 1501 of the American Federation of State, County, and Municipal Employees terminated late in 1962. and a new agreement was negotiated. Personnel Manager John McKew has strengthened our personnel practices and the benefits of improved hiring procedures have already become evident.

Mr. Joseph Bell, formerly Supervisor of Birds, replaced Mr. Peter Ames as Assistant Curator of Birds during the summer, and Mr. Andrew Winnegar, a Society employee since 1940, was promoted to Supervisor of Birds. Mr. John Kolb was promoted to Park Foreman during May and Mr. Robert Jungblut was employed to fill the vacancy created by the retirement of Mr. Edward Furey. Mr. Furey was a competent veteran of 37 years with the Society.

Zoological Park Combined Census

December 31, 1963

	Species & Subspecies	*Specimens*
Mammals	204	624
Birds	622	1,543
Amphibians and Reptiles	250	570
Totals	1,076	2,737

Summary of Attendance

Month	*1962*	*1963*
January	45,211	29,349
February	46,720	39,175
March	160,996	181,850
April	287,336	336,625
May	362,097	344,702
June	316,985	318,188
July	431,265	354,880
August	388,613	392,849
September	243,727	222,374
October	166,685	212,976
November	87,750	105,394
December	53,611	36,496
	2,590,996	2,574,858

The total number of visitors at the Zoological Park between its opening on November 9, 1899, and December 31, 1963, was 139,417,391.

DEPARTMENT OF MAMMALS

Joseph A. Davis, Jr., *Curator*

Grace Davall, *Assistant Curator*

Joseph Ruf, *Head Keeper*

Lee S. Crandall, *General Curator Emeritus*

The Society's collection of mammals at the end of 1963 numbered 624 specimens, of 204 species and subspecies, representing 13 orders and 49 families.

The Collection

The program of forming self-replenishing breeding herds of rare, endangered and difficult-to-obtain species, begun in 1962, has continued. A pair of young Gemsbok and a female White-tailed Gnu arrived to complete standing orders, and groups of two males and three females each of Jackson's Hartebeest and Impala were acquired, as well as a pair of Grevy Zebras. We are still unable to obtain a mate for our female Takin.

Mountain Gorillas have never been easy to obtain, so when the Royal Zoological Society of Antwerp offered us a six-year-old young adult male, we were quick to accept. The young gorilla settled almost immediately into his quarantine quarters in the Animal Hospital, and when released to the Great Apes House proved to be compatible with Sumaili, our adult female. Prior to the introduction of the two Mountain Gorillas we had attempted, in August, to keep our two adult Lowland Gorillas together. At first they appeared to accept each other, but after a few weeks their skirmishes led to injuries and we were forced to separate them.

Occasionally we are asked by research zoologists for assistance in handling animal shipments. Late in July we processed a large shipment of tenrecs sent from Madagascar by Dr. Edwin Gould of Johns Hopkins University. In September Dr. Gould arrived to claim his tenrecs, leaving with us a fine series of specimens of four species, three of them new to the Society's collection, and five House Shrews. The tenrecs, like the shrews, are not uncommon in Madagascar but due in part to their exacting dietary requirements are rarely seen in zoological collections.

Other acquisitions of interest include a group of Springhaas, peculiar jumping rodents from Africa, a second Black-shouldered Opossum, four Tarsiers, a pair of Abert's Squirrels from New Mexico, African Epaulet Bats and a pair of magnificent West African Forest Buffalo bred at the Catskill Game Farm.

The death of our Silky Anteater *(Cyclopes didactylus)* ended a remarkable longevity record for the species—17 months, 21 days in the collection. The best previous longevity record for the species (also set here) had been 73 days.

As tragic as it was unexpected was the loss, in March, of our male Nile Hippopotamus, Peter II. Another serious loss was the male Gerenuk, which was found dead in November.

Males of certain common zoo species (and sometimes females, too) are difficult to dispose of by sale or trade and our herds often tend to develop an unbalanced sex ratio. We have found a partial solution to the problem by placing some of these surplus animals on deposit in small zoos. Animals on deposit serve as a reservoir from which we can draw in the future, and at the same time they give us much-needed space that would otherwise be required for reserve breeders.

Fifty-one surplus specimens were sold, traded or placed on deposit in other zoos.

The Breeding Program

Ninety-five viable offspring were produced in the mammal collection, an increase over the previous year's total. More significant than the number of births is the list of species in which they occurred. Gerenuks are among the most difficult of antelope to keep in captivity, and breeding is rare; our fawn, a female, is the first born in the Western Hemisphere. A Wisent, White-tailed Gnu, Okapi and Pigmy Hippopotamus were born during the year. A partial list of other births includes Grant's Zebra, Yak, Bison, Nyala, Thomson's Gazelle, Blackbuck, Mouflon, Roosevelt's Elk and six other species of deer, Mandrill, Wanderoo, Agile Wallaby, Palm Civet, Kinkajou and Lion. Three Small Malayan Mouse-deer, or Chevrotains, were born during 1963, with both of our two breeding females pregnant again by the year's end.

Physical Improvements

The first major exhibit range for hoofed animals to be added to the Zoological Park in several years was completed in December. The new Wisent range, in the woods east of the Roosevelt's Elk enclosure, planned as a conventionally moated area, was modified during construction and patterned after a design noted by Director Conway at

the Rotterdam Zoo. The Rotterdam design combines a low, inward-slanting fence with a shallow moat, providing an excellent unobstructed view of the enclosure. The new design, moreover, cost considerably less in time and materials than a conventional concrete moat.

An extension of the Père David's and Chinese Water Deer range was completed, with fencing that permits access only to the smaller species. The new addition, with its brushy cover will, we hope, increase the survival rate of the Water Deer fawns, which are usually born during the chill, rainy days of early spring. Two holding rooms in the Small Mammal House were converted to a red/white light cycle, enabling us to condition new nocturnal animals before placing them on exhibition. Additional shift doors were installed in the Antelope House during the summer. The ability to move antelope from one stall to another indoors in winter has greatly increased the efficiency of our operations.

The rapid increase in our chevrotain population necessitated moving some of them to new and larger quarters. The Curator, with Assistant Head Keeper Rolla and Keepers Barbetto and Mahoney, began the creation of a large, naturalistic setting for these interesting ungulates in the Monkey House, the only place immediately available.

Research

The Curator continued his investigation of otter behavior and communication, principally with two South American species, *Lutra annectens* and *L. enudris,* and in July made preliminary observations on free-living Sea Otters at Point Lobos Reserve, California. With the assistance of keepers in the Small Mammal House notes were added to his study of the reproduction of the Small Malayan Chevrotain. The department also cooperated with researchers from Harvard, Duke and Johns Hopkins Universities, and the University of California.

Other Activities

Mr. Davis attended the annual meetings of the American Society of Mammalogists in Albuquerque, New Mexico, and visited five zoos in the west. In cooperation with Designer Johnson he produced an attractive educational label for the new Wisent range.

Publications and Papers (Mr. Davis)

"Oka, this is Mambo." *Animal Kingdom,* Vol. 66, No. 5, 1963.

Reproduction in *Tragulus javanicus.* American Society of Mammalogists, Annual Meeting, Albuquerque.

Summary

Last year's efforts to build self-replenishing herds are beginning

to bear fruit. New species have been included in the program. A fine male Mountain Gorilla was added to the collection, as were a number of rare and interesting small mammals. A new range for Wisents and several improvements of lesser scope were completed, increasing the efficiency of our operation.

Forms New to the Collection, Acquired in 1963

Striped Tenrec—*Hemicentetes semispinosus* (Cuvier)
Hairy Striped Tenrec—*Hemicentetes nigriceps* Günther
Small Hedgehog-Tenrec—*Echinops telfairi* Martin
Large Hedgehog-Tenrec—*Setifer setosus* (Schreber)
Madagascar House Shrew—*Suncus murinus* (Linnaeus)
Seba's Short-tailed Fruit Bat—*Carollia perspicillata* (Linnaeus)
Abert's Squirrel—*Sciurus aberti* Woodhouse
Cliff Chipmunk—*Eutamias dorsalis dorsalis* (Baird)
Valley Pocket Gopher—*Thomomys bottae* (Eydoux & Gervais)
Arizona Cotton Rat—*Sigmodon hispidus cienegae* A. B. Howell
Jackson's Hartebeest—*Alcelaphus buselaphus jacksoni* (Thomas)

Census of Mammals
December 31, 1963

Orders		*Species & Subspecies*	*Specimens*
Marsupialia	Kangaroos, Phalangers, Opossums, etc.	5	10
Insectivora	Moles, Shrews, Hedgehogs, etc.	5	14
Chiroptera	Bats	1	1
Primates	Apes, Monkeys, Lemurs, Marmosets, etc.	47	84
Edentata	Armadillos, Sloths, Anteaters	3	4
Pholidota	Pangolins	1	1
Rodentia	Squirrels, Beavers, Mice, Porcupines, etc.	38	125
Carnivora	Bears, Raccoons, Cats, Dogs, Otters, etc.	42	86
Pinnipedia	Seals, Sea Lions, Walruses	4	9
Tubulidentata	Aardvarks	1	1
Proboscidea	Elephants	2	3
Perissodactyla	Horses, Tapirs, Rhinoceroses	6	11
Artiodactyla	Cattle, Sheep, Antelopes, Camels, Giraffes, Deer, Swine, Hippopotamuses	49	275
	Totals	204	624

Summary: Orders, 13; Species & Subspecies, 204; Specimens, 624.

DEPARTMENT OF BIRDS

William G. Conway, *Curator*

Joseph Bell, *Assistant Curator*

Grace Davall, *Assistant Curator*

Andrew Winnegar, *Head Keeper*

Lee S. Crandall, *General Curator Emeritus*

The Society's bird collection included 622 species and 1,543 specimens on December 31, 1963. Twenty-two orders were represented. While still among the world's largest, the 1963 collection is our smallest in several years. Because of the impending demolition of the Main Bird House (probably in 1965) we are making efforts to reduce the collection.

The Collection

Preparation for the 1964 opening of the Aquatic Birds exhibit has been the keynote of our acquisitions for 1963; of 458 birds received, 264 were aquatic, including 22 of the 39 species new to the collection for the year.

Several of the new species deserve particular mention. Three Magellanic Flightless Steamer Ducks were received in May. They are large, heavy-bodied, small-winged birds incapable of flight but able to run, swim and dive faster than most ducks. Two Lesser Green Broadbills, representatives of a small Old World family resembling the cotingas of Central and South America, are the first members of their family to be represented in our collection.

Forms New to the Collection, Acquired in 1963

Long-tailed Cormorant—*Haliëtor africanus africanus* (Gmelin)
Green-backed Heron—*Butorides striatus atricapillus* (Afzelius)
Squacco Heron—*Ardeola ralloides* (Scopoli)
Reef Heron—*Demigretta sacra* (Gmelin)
Salmon's Tiger Bittern—*Tigrisoma salmoni salmoni* Sclater & Salvin
Black-headed Heron—*Ardea melanocephala* Vigors & Children
African Spoonbill—*Platalea alba* Scopoli
Magellanic Flightless Steamer Duck—*Tachyeres pteneres* (Forster)

Ecuadorian Crane Hawk—*Geranospiza nigra balzarensis* W. L. Sclater
Lesser Gallinule—*Gallinula chloropus pauxilla* Bangs
African Spur-winged Plover—*Hoplopterus spinosus* (Linnaeus)
Kittlitz's Sandplover—*Charadrius pecuarius pecuarius* Temminck
Tundra Ringed Plover—*Charadrius hiaticula tundrae* (Lowe)
Caspian Plover—*Eupoda asiatica* (Pallas)
Marsh Sandpiper—*Tringa stagnatilis* (Bechstein)
Greenshanks—*Tringa nebularia* (Gunneras)
Green Sandpiper—*Tringa ocrophus* Linnaeus
Buff-breasted Sandpiper—*Tryngites subruficollis* (Vieillot)
Little Stint—*Erolia minuta* (Leisler)
East African Pratincole—*Glareola pratincola fülleborni* Neumann
White-winged Black Tern—*Chlidonias leucoptera* (Temminck)
Black Guillemot—*Cepphus grylle grylle* (Linnaeus)
Black-winged Hermit—*Phaethornis yaruqui yaruqui* (Bourcier)
Black-eared Fairy—*Heliothryx aurita aurita* (Gmelin)
White-vented Star-throat—*Heliomaster longirostris albicrissa* Gould
Eastern White-collared Kingfisher—*Halcyon chloris armstrongi* Sharpe
Assam Hoopoe—*Upupa epops longirostris* Jerdon
Costa Rican Golden-fronted Woodpecker—*Melanerpes aurifrons hoffmannii* (Cabanis)
Lesser Green Broadbill—*Calyptomena viridis continentis* Robinson & Kloss
Reichenow's Pitta—*Pitta reichenowi* Madarasz
Assam Yellow-cheeked Titmouse—*Parus xanthogenys spilonotus* Bonaparte
Black-capped Sibia—*Heterophasia capistrata bayleyi* (Kinnear)
Snowy-headed Robin-chat—*Cossypha niveicapilla melanota* (Cabanis)
Congo Blue-shouldered Robin-chat—*Cossypha cyanocampter bartteloti* Shelley
Semliki Fiery-breasted Bush-shrike—*Malaconotus cruentus adolfi-friederici* Reichenow
Rothschild's Seed-cracker—*Pirenestes ostrinus rothschildi* Neumann
Grant's Blue-billed Seed-cracker—*Spermophaga poliogenys* (Ogilvie-Grant)
Acadian Sparrow—*Ammospiza caudacuta subvirgata* (Dwight)
Seaside Sparrow—*Ammospiza maritima maritima* (Wilson)

Botulism was not a problem this year and we believe that alterations to the edge of the Wildfowl Pond, to allow better drainage, were a contributing factor. Research at the Delta Waterfowl Research Station in Manitoba has indicated that midge larvae dying in drying mud banks may provide a virulent source of botulism toxin. We tried to mitigate this problem with sprinkling devices to keep our larvae happy and the new drainage permitted a continuous flushing of danger areas.

An Azure Jay (received in 1925), a Livingstone's Touraco (received in 1941) and a Garnet Hummingbird (received in 1953) were losses of note in 1963.

The Breeding Program

Each year careful record is kept by the Head Keeper of every egg laid in the collection. The first entry for 1963 was a Harlequin Quail, an African species, in January. In February, eggs from Black-necked

Swans, Cereopsis Geese and Killdeers were added and by December 31, 74 species had laid 1,499 eggs at the Zoo.

Of necessity, rearing was much more selective this year because of the space problem incurred by waterbird acquisitions.

A male Wattled Crane was sent by the St. Louis Zoological Gardens in a cooperative breeding project, as a mate for our female, the only female in the United States. Two young cranes were hatched in mid-December as a result of this pairing.

Lesser Brazilian Teal and Barrow's Golden-eye were reared in our collection for the first time. The parent Barrow's Golden-eyes were originally hatched from eggs shipped to us from Iceland several years ago.

Physical Improvements

The new Aquatic Birds exhibit is still under construction but opening in the fall 1964 is expected.

The Great Flying Cage has had a complete face-lifting. Topsoil was added and contoured, then supplemented with a fine planting of grass and evergreens. The exhibit was renamed "Bird Walk" and an attractive bridge was installed by the Construction Department to allow visitors to pass through the cage and view the birds without wire barriers. It has already proved to be a great success. North of Bird Walk, the old duck and goose paddocks have been replaced by a new bird exhibit where a special fence, plantings and a series of meandering water-courses make the "South American Llanos" a fine place to show flamingos, spoonbills, screamers, storks and a variety of Latin American waterfowl.

The Bird Department staff executed an ingenious series of small canals and pools on the east and south sides of the Ostrich House to provide a long-needed supply of water to these enclosures, an innovation we believe will prove conducive to breeding, particularly in crane enclosures.

Research

Shortage of staff continues to make the initiation of significant new basic research impractical. Observational work continues. Practical and applied research by Mr. Bell included a new series of experiments in bird diet and feather coloration, while Mr Conway continued his observations on flamingos and cranes and completed observation on the development of sexually dimorphic coloration in Wreathed-billed Hornbills. Information gathered on incubation and laying patterns of captive birds in the collection is now assuming formidable proportions and will soon demand publication.

A taped recording of a Herring Gull alarm call, obtained through the courtesy of Dr. Hubert Frings of the University of Pennsylvania, has enabled us to pursue a bit of practical research with beneficial results. Amplifying equipment installed near Wildfowl Pond is used to broadcast the alarm at duck feeding time when marauding gulls become a serious problem. Results have been inconsistent but generally worthwhile.

Further experiments with the phenomenon of imprinting were conducted during the spring and the application of imprinting techniques to future activity displays appears very exciting. Experiments in 1962 and in 1963 with ultra-violet bug traps revealed a valuable new food source for delicate insectivorous species.

As usual the Department cooperated in the research programs of many other institutions.

Publications (Mr. Bell)

"The Art and Practice of Zoo Keeping." *Animal Kingdom*, Vol. 66, No. 4, 1963.

"Jamaica Bay Wildlife Refuge." *Animal Kingdom*, Vol. 66, No. 5, 1963.

Summary

Construction continued on the Aquatic Birds exhibit and collections were gathered for its opening. A viewing bridge was placed through a relandscaped Great Flying Cage and the renovated exhibit was renamed "Bird Walk." The old duck and goose paddocks were replaced by a landscaped new display, called the "South American Llanos."

The breeding program was productive but research efforts continue to lag.

Census of Birds

December 31, 1963

Orders		*Species & Subspecies*	*Specimens*
Sphenisciformes	Penguins	6	20
Casuariiformes	Cassowaries and Emus	3	5
Tinamiformes	Tinamous	5	13
Pelecaniformes	Pelicans, Cormorants, etc.	10	25
Ciconiiformes	Herons, Ibises, Storks, etc.	25	62
Phoenicopteriformes	Flamingos	6	38
Anseriformes	Swans, Ducks, Geese and Screamers	104	445
Falconiformes	Vultures, Hawks and Eagles	32	39
Galliformes	Quail, Pheasants, etc.	36	111
Gruiformes	Hemipodes, Cranes, Trumpeters, etc.	29	85
Charadriiformes	Plovers, Sandpipers, Gulls, etc.	44	143
Columbiformes	Pigeons, Doves and Sandgrouse	24	53
Psittaciformes	Parrots, etc.	14	21
Cuculiformes	Touracos and Cuckoos	5	6
Strigiformes	Owls	12	18
Caprimulgiformes	Frogmouths, Nighthawks, etc.	2	2
Apodiformes	Hummingbirds	8	11
Coliiformes	Mousebirds	1	1
Trogoniformes	Trogons and Quetzals	1	3
Coraciiformes	Kingfishers, Hornbills, etc.	19	29
Piciformes	Barbets, Toucans and Woodpeckers	19	30
Passeriformes	Perching Birds	217	383
	Totals	622	1,543

Summary: Orders, 22; Species & Subspecies, 622; Specimens, 1,543.

DEPARTMENT OF REPTILES

HERNDON G. DOWLING, *Curator*

STEPHEN SPENCOOK, *Head Keeper*

THE COLLECTION numbered 682 specimens of 250 species and subspecies of amphibians and reptiles at the end of 1963. The total of specimens is close to that of past years and is determined mainly by the holding capacity of the Reptile House and the size of our keeper force. The number of kinds of amphibians and reptiles declined by only eight, even though we have continued to relieve the "behind-the-scenes" areas of specimens that have little chance of exhibition, a research collection of ratsnakes was disposed of when the grant providing for their care was terminated and a number of crocodilians were donated to other zoos. Even so, only the reptile collection of the San Diego Zoo exceeds ours in size and variety.

THE COLLECTION

Of the 727 reptiles and amphibians acquired this year, 507 were gifts, 116 were born or hatched here, 94 were purchased and 10 were received on exchange. Most of the gifts were pet turtles and caimans or miscellaneous amphibians and reptiles brought back from summer camps and vacations trips.

Among the more significant gifts were a Fer-de-Lance from Dr. Thomas Aitken, a Fer-de-Lance and a Bushmaster from Mr. John Dunston and a Bushmaster from Emperor Valley Zoo, all of Port-of-Spain, Trinidad. Father Richard Goris of Tokyo sent a group of Okinawan Pitvipers; Mrs. Dora Weyer of Liberia sent a Rhinoceros Viper and a Calabar Python; Mr. Neil Schernoff of Miami brought us a group of reptiles from the Bahamas. Mr. Charles Bogert of the American Museum of Natural History donated two Southern Pacific Rattlesnakes and Mr. Carl Kauffeld of the Staten Island Zoo presented several juvenile Russell's Vipers that had been born there. Two Macaws were donated by Mrs. Andre Michalopoulos and have added color to the Conservatory Greenhouse area behind the crocodile pools.

Two of our Galapagos Tortoises were returned from Crandon Park in Miami. They were among the tortoises collected on southern Isa-

bela Island by Dr. Charles H. Townsend in 1928 and had been loaned to Crandon Park in 1957 when our winter quarters were inadaquate. With the renovation of the Farm Greenhouse as winter quarters, it was possible to request their return.

Among the more interesting purchases were 11 One-horned Giant African Chameleons and groups of reptiles from Madagascar and Ghana.

An Indian Rock Python, acquired in 1951, laid a clutch of 32 eggs but unfortunately they were not viable. A number of other reptiles did produce viable young, however. A list of these follows:

Reptiles Hatched or Born in 1963

Species	*Date*	*Number*	*Bred Here*
Reeves Turtle, *Chinemys reevesi*	July 1	2	Yes
Tokay Gecko, *Gekko gecko*	Aug. 8	3	Yes
Gray Tree Boa, *Corallus enydris*	Aug. 23	8	Yes
Madagascan Boa, *Sanzinia madagascarensis*	March 5	8	No
Eastern Hognose Snake, *Heterodon platyrhinos*	July 28-Aug. 4	62	No
Eastern Gartersnake, *Thamnophis sirtalis*	Aug. 18	15	No
Asiatic Cobra, *Naja naja*	Oct. 24-25	10	Yes
Black-tailed Rattlesnake, *Crotalus molossus*	Sept. 10	5	No
Black-tailed Rattlesnake, *Crotalus molossus*	Nov. 15	3	No
	Total:	116	

Important losses were mainly through donation to other institutions rather than by death. An exception was the death of a Reticulated Python. In the Park since 1951, it was not only one of the oldest, but also our largest snake (19 feet, 2 inches; 205 pounds). In had been ailing for more than a year and after repeated medical treatments had failed to bring about a cure it was finally euthanized. Autopsy revealed an apparent case of reptile tuberculosis.

Beside making gifts of representative harmless reptiles to several local schools, we presented to the American Museum of Natural History a number of specimens we could not exhibit. Asiatic Cobras hatched here in 1963 were sent to zoological parks in Detroit, Fort Worth and San Antonio, and Anacondas born here in 1962 were donated to zoos in Columbus, Detroit, Fort Worth and Miami and to the Steinhart Aquarium of San Francisco.

The greatest visible changes in the collection resulted from the donation of nine of our largest crocodilians to other zoos. Most crocodilians are received here as young-of-the-year but they grow at an amazing rate (often more than a foot per year) under our conditions

of perpetual warm water and adequate food. Our exhibition areas are not large enough or safe enough to maintain adults of the larger species, so these must be disposed of before they exceed ten feet or so (some crocodilians ultimately exceed 20 feet).

Most of the crocodilians shipped out this year were received shortly after the reopening of the renovated Reptile House in 1954. Such a disposal will probably become an almost annual affair.

Crocodilians Donated to Other Institutions

	Year of Arrival	*Length on Departure*	*Receiving Zoo*
American Alligator, *Alligator mississipiensis*	1957 (?)	7′ 1″	Buffalo
American Crocodile, *Crocodylus acutus*	1957 (?)	6′ 10″	Buffalo
American Crocodile, *Crocodylus acutus*	1956 (?)	8′ 5″	Houston
Slender-nosed Crocodile, *Crocodylus cataphractus*	1956	8′ 0″	Pittsburgh
Nile Crocodile, *Crocodylus niloticus*	1941	10′+	Pittsburgh
Salt Water Crocodile, *Crocodylus porosus*	1958	7′ 8″	Pittsburgh
Salt Water Crocodile, *Crocodylus porosus*	1954	10′ 5″	St. Louis
Mugger Crocodile, *Crocodylus palustris*	1955	7′ 10″	St. Louis
Mugger Crocodile, *Crocodylus palustris*	1955	8′ 5″	St. Louis

The pools thus vacated were restocked with younger and smaller crocodilians. Repositioning allowed us to place three Chinese Alligators in a separate enclosure and to isolate two adult American Alligators.

Physical Facilities

Areas added to the department last year were improved. In the Farm's Greenhouse, heating pipes were put under the floor, cement drinking and bathing pools were added and an exhaust fan was installed, thereby making excellent winter quarters for our giant tortoises. The Galapagos area was planted to resemble the island landscape and descriptive labels told something of the background of these islands. Some tropical American lizards and turtles were put in the South American Llanos on an experimental basis.

At the Reptile House, the outside enclosures were replanted and regraded, the Nile Crocodile enclosure was modified to accommodate a pair of American Alligators and the King Cobra exhibit was renovated. The air-conditioned sections were modified to allow major vari-

ations in temperature for different kinds of reptiles and the ancient fibreglass canopies at each end of the building were replaced with more opaque material.

Research and Other Activities

The Curator continued his studies of ratsnake systematics and zoogeography and furthered his work on the relationships of colubrid snakes. He attended the XVIth International Congress of Zoology in Washington, the annual meetings of the American Institute of Biological Sciences in Amherst, the American Society of Ichthyologists and Herpetologists in Vancouver and the American Association for the Advancement of Science in Cleveland. He also attended the meeting of the American Association of Zoological Parks and Aquariums at Dallas and Fort Worth and visited the zoological parks of those cities and San Antonio.

He continued his work on Galapagos herpetology and conservation and talked on these subjects to groups in Eastern Kentucky State College, the Philadelphia Academy of Sciences, Brooklyn College, Bank Street College of Education and the Explorers Club of New York. He lectured on snake bite and the problems of its treatment at Columbia University Medical School and at the Downtown Veterans Hospital, and on the Zoological Society's conservation efforts in Africa at Lafayette College, Easton, Pennsylvania.

Publications (Dr. Dowling)

Madagascar: Distant Home of "American" Reptiles. *Animal Kingdom,* Vol. 66, No. 1, 1963.

A Giant Step Toward Keeping Giant Chameleons. *Animal Kingdom,* Vol. 66, No. 6, 1963.

Current Longevity Records—1963

Species	*Arrived in Park*
Albemarle Giant Tortoise, *Geochelone e. elephantopus* (Harlan) (At Crandon Park, 1957-62)	1928
Duncan Saddleback Tortoise, *Geochelone elephantopus ephippium* (Guenther)	1928
Indian Gavial, *Gavialis gangeticus* (Gmelin)	1946
American Alligator, *Alligator mississipiensis* (Daudin)	1950
South American Mud Turtle, *Kinosternon scorpioides* (Linnaeus)	1950
Indian Rock Python, *Python molurus* (Linnaeus)	1951
King Cobra, *Ophiophagus hannah* (Cantor)	1953
Indian Rock Python, *Python molurus* (Linnaeus)	1954
Reticulated Python, *Python reticulatus* (Schneider)	1954
Brown Sand Boa, *Eryx johnii* (Russell)	1954
Pigmy Rattlesnake, *Sistrurus miliarius* (Linnaeus)	1954

Reptiles New to the Collection, Acquired in 1963

Hamilton's Spotted Turtle, *Geoclemys hamiltoni*
Yellow-headed Tortoise, *Geochelone elongata*
Four-toed Tortoise, *Testudo horsfieldi*
Calabar Ground Python, *Calabaria reinhardtii*
Red-spotted Snake, *Spalerosophis arenarius*
West Indian Water Snake, *Tretanorhinus variabilis*
Green Tree Viper, *Atheris chloraechis*
Many-horned Viper, *Bitis cornuta*
Leaf-nose Viper, *Eristocophis mcmahonii*

Summary

Relatively minor improvements of the facilities of the department were made. A major gain was the return of our two large Galapagos Tortoises from Crandon Park, Miami. A major loss was the disposal of nine of our large crocodilians to other zoological parks. The collection showed little change in size; any considerable expansion will require additional housing and manpower.

Census of Amphibians and Reptiles

December 31, 1963

Orders	Amphibia	*Species & Subspecies*	*Specimens*
Caudata	Salamanders	11	29
Salientia	Frogs and Toads	22	43
	Reptilia		
Testudines	Turtles	71	266
Crocodylia	Alligators and Crocodiles	12	56
Squamata			
Sauria	Lizards	29	76
Serpentes	Snakes	105	212
	Totals:	250	682

Summary: Orders 5; Species, 250; Specimens, 682.

ANIMAL HOSPITAL

Charles P. Gandal, *Veterinarian*

Professionally, the Animal Hospital staff must look upon all its patients and inmates with equal concern; humanly, some are of more interest than others and the outstanding example in 1963 was Pili-pili, a young male Mountain Gorilla who arrived in May and stayed in the hospital for 113 days while undergoing quarantine and tuberculin testing.

Pili-pili's weight increased from 156 to 168 pounds while he was in the hospital and all tests and adjustments were relatively uneventful. Rather than immobilize him for the standard intrapalpebral primate tuberculin test, we used the comparatively new human "Sterineedle Test," which revealed that he was free of tuberculosis.

Cases of Especial Interest

Largest of the year's patients was Cutie, an Indian elephant, who for no discernible reason became severely constipated and required treatment for a week. She was given massive oral doses of a medication used to treat this condition in cows and horses, augmented by daily injections by means of an injection gun, and after the sixth day this treatment achieved the desired results.

Continuing our observation of white muscle disease in the Nyala herd, as a control measure we did not give selenium injections to any of the newborn males this year but continued the females on the prophylactic injections. To date the results have not been conclusive but do suggest the importance of selenium in the prevention of the disease.

In the middle of the year, following discussions with nutritionists, a change in our basic GLF grain diet was instituted. In addition to adding a trace element supplement to the feed, the fibre content was reduced from 11.3% to 10%. The protein content was increased from 14% to 16%, the fat content from 3% to 4%, and the total digestible nutrients increased from 1,366 to 1,450 pounds per ton. Not only is the diet improved, but we were able to save $5.00 a ton over the previous price.

Because of the common occurrence of simian disease, a bone disease affecting monkeys, especially the South American species, we were particularly interested in finding a satisfactory, palatable and

readily available product for the nutrition of monkeys. Phoscaron D, a product manufactured for pregnant women, was found to be extremely efficacious in preventing the development of simian disease and in treating early cases. Its chocolate-flavored base makes it readily acceptible to monkeys.

When treatment is almost impossible, Nature may sometimes be relied upon. This was the case with a young male Blackbuck that suffered a fracture while living with the herd on a large range. Due to the flightly nature of this herd and the difficulty of immobilizing the animal even with an injection gun, it was decided to let the animal stay with the herd, as the fracture was in good alignment and not compounded. At the end of five weeks the fracture had completely healed and it was difficult to ascertain which of the animals in the herd had sustained it.

Numerous avian fracture patients were presented this year and intramedullary pinning was used successfully in a Crowned Crane, a Demoiselle Crane and, of particular interest, in the Monkey-eating Eagle which sustained bilateral fractures in 1962 and was recorded in last year's *Annual Report*. In 1963 this bird suffered another fracture of the tibia and knowing his amenability to hospitalization and that we could successfully sling him, we decided to set the fracture using an intramedullary pin. The eagle was anesthetized, the surgery performed and the bird was slung with the assistance of Hospital Attendant Gus Waltz, who applied his own brand of physiotherapy daily. After seven weeks the bird was removed from the sling and shortly thereafter completed his recovery.

Other interesting surgical cases included suturing the lower lip of a Formosan Deer that had run into the fence, necessitating over seventy sutures to effect the proper closure.

The enucleation of an eye from our male Patas Monkey which sustained a severe traumatic injury, irreparably damaging the eye, was followed by an uneventful recovery. The animal will be used for breeding.

One of the horns on our breeding male Thomson's Gazelle was loosened by his vigorous actions and ended up pointing toward the ground. It was splinted back in place with aluminum wire and after two months healing appeared complete. However, the attachment gradually weakened and the horn again drooped noticeably. We resorted to surgery and aseptic removal of the entire horn, suturing the resultant wound and achieving a fine end result with no scar noticeable and a minimum interruption to the animal's breeding or display value.

One of the most interesting surgical patients was a female ferret used for demonstrations by the Education Department. She showed bilateral symmetrical loss of hair over much of the body and also some endocrine reproductive dysfunction. This is a common syndrome in aged female dogs and we treated our ferret by performing an ovariohysterectomy, the prescribed treatment in canines. Within six weeks vigorous new hair growth was observed and the animal showed no further tendencies toward loss of hair or endocrine problems. The ferret's reproductive tract was examined by pathologists at Cornell University and the findings and results of treatment will be published.

A combination of promazine and meperidine was used effectively for sedation of one of the Aquarium's young walruses, to permit handling for an extensive X-ray series which fortunately turned out negative.

One of the largest egg-bound birds we have ever operated on was presented this year when a pea hen was brought in. The exact problem was not known at the time but it was readily ascertained that she was egg-bound and in need of immediate help. Utilizing the technique that we developed several years ago she was anesthetized and the egg delivered just as one might deliver a mammalian baby. The bird was discharged the following day.

Another case in which avian eggs were indirectly involved was that of a King Penguin which, after fifty days of sitting on an egg, became extremely stiff and had great difficulty in moving about the compartment. Marked improvement and eventual recovery followed the administration of antibiotics and steroids which were stuffed into fish and fed to the patient.

Under the head of preventive measures was the case of a male Reindeer which for several years has been plagued by fly larvae in his antlers before shedding of the velvet. This year we supplied liberal amounts of fly spray, took measures to eliminate the fly hazard within the corral and used repellants on the antlers themselves. No maggots were seen on the antlers this year and a fine rack was produced by a much happier male Reindeer.

Our aged female tiger Rani, constant companion of the lioness Zambesi since 1944, had to be euthanized because of various senile factors. A Père David deer was also euthanized following development of an extensive squamous cell carcinoma on the jaw. Our fine male hippopotamus died quite suddenly and intensive autopsy and toxicological examination revealed the ingestion of some highly caustic, alkaline substance, the origin of which was not satisfactorily established.

Our entire herd of three Gayals, a male, female and baby, was wiped out by malignant head catarrh, a sporadic virus disease of cattle which is carried by some African antelopes that are asymptomatic but capable of transmitting the disease to certain bovine species. The last of the three animals was sent to Cornell University before death for intensive investigation. Cornell's diagnosis coincided with ours and as there is not as yet any satisfactory treatment for viral diseases, our best practice is to isolate susceptible species from the known carrier antelope. The Gayals had been quartered next to our White-tailed Gnu group in the Zebra House.

In using the Cap-Chur gun for many procedures including the medication of large, difficult-to-handle mammals, succinylcholine chloride remains our drug of choice for most immobilization procedures although in the past year we have had excellent clinical results when using "Sernylan" on primates. We have also successfully combined an initial dose of succinylcholine to immobilize our large cats with subsequent intravenous administration of surital sodium to induce long-term anesthesia for extensive surgery. Surital is an ultra short-term anesthetic when used on common domestic animals but has a much longer span of effectiveness in large cats, and when administered in the tail vein in conjunction with a continuous drip apparatus is it extremely efficacious and provides us with a safe, satisfactory anesthetic of choice for the large cats.

Preventive Medicine

Preventive medicine is a most important zoo veterinary function and included vaccination of susceptible species against feline enteritis, canine hepatitis and canine distemper, tuberculin testing and quarantine of all newly acquired primates and complement fixation tests for psittacosis in psittacine accessions.

In addition to bacterial cultures, sensitivity tests and routine blood and urine tests, 427 routine stool examinations were run on 275 mammals and 152 birds, and a total of 188 vermifuge treatments were administered throughout the year.

Research

In the line of cooperative research, 263 specimens were supplied to 28 investigators. The variety of their projects is revealed by listing a few: Dr. Alan Wilson, "Lactic Dehydrogenase Determinations in Liver and Muscle Tissue," for which we supplied muscle and liver specimens from 44 birds and 3 mammals; Drs. Ralph Richard and Philip Corfman, "Demonstration of Chromosome Numbers and Morphology in Various Zoo Species," to which we contributed 15

blood and 7 tissue specimens. At the Albert Einstein Medical College the Veterinarian served as sheep anesthetist on a liver biopsy project with Dr. Irwin Arias of the Department of Medicine, "The Liver of Sheep with an Inherited Defect in Hepatic Excretion."

Other Activities

The Veterinarian visited the Zoological Parks of Detroit, Philadelphia and Washington to examine their animal food preparation facilities in preparation for renovation of our own unit. He also attended the meeting of the American Association of Zoological Parks and Aquariums in Washington, the annual convention of the American Veterinary Medical Association in New York and the convention of the Zoo Veterinarians' Association held in conjunction with the AVMA meeting. He also attended a symposium on animal geriatrics in New York.

Publications

Correcting Rectal Prolapse: A Simplified Technic. *Modern Veterinary Practice*, July, 1963.

Therapeutic Management of Non-Nursing Mothers. *Small Animal Clinician*, April, 1963.

Avian General Anesthesia. International Zoo Yearbook, Vol. IV.

Papers Presented

Captive Wild Animals and Their Emotional Reactions. Weekly seminar, Creedmore State Hospital, Queens Village, L.I.

Surgery of Parakeet Tumors. American Veterinary Medical Association Centennial Meeting (including film).

Surgery of Subcutaneous Tumors in Parakeets. American Association of Zoological Parks and Aquariums, Mid-winter Meeting (The Society-produced movie regarding these techniques was shown).

Care, Treatment and Surgery of Pet Birds. Weekly Seminar, American Society for Prevention of Cruelty to Animals, New York.

Zoo Veterinary Problems of Interest to the Practitioner. Georgia Veterinary Medical Assoc. Annual Meeting.

First Aid

There were 1,752 cases requiring first aid, of which 715 were employees and 1,037 visitors. Twenty-one members of the Zoological Park Blood Bank donated blood and 25 pints were distributed among 9 recipients.

In the mortality tables that follow, "Total in Collection" is arrived at by adding to the census at the beginning of the year all animals acquired by purchase, exchange, gift or born alive. Animals disposed of alive by sale or exchange during the year are not deducted. No acclimatization period following birth or arrival is allowed.

Mortality Table

Mammals

Year	*Total in Collection Throughout the Year*	*Died*	*Mortality Percentage*
1963	839	136	16.20
1962	808	202	25.00
1961	724	128	17.68
1960	737	122	16.55
1959	718	106	14.76
Totals	3,653	694	

Average mortality for past years.....18.99
Average mortality for past 20 years.....18.41

Birds

Year	*Total in Collection Throughout the Year*	*Died*	*Mortality Percentage*
1963	2,012	334	16.60
1962	1,890	385	20.36
1961	2,339	437	18.68
1960	2,119	273	12.88
1959	2,051	343	16.72
Totals	10,411	1,772	

Average mortality for past 5 years.....17.10
Average mortality for past 20 years.....16.82

DEPARTMENT OF EDUCATION

HERBERT J. KNOBLOCH, *Associate Curator*

PHYLLIS K. LINNEMANN, *Museum Instructor*

MICHELE A. PERRAULT, *Museum Instructor*

WITH ALMOST monotonous regularity this department must report new high records of visits to the Zoological Park by school classes and other organized educational groups. May was, as usual, the best and again a record-breaking month.

	1962	*1963*
Schools, Organizations and Institutions	4,290	5,238
Classes and Organized Groups	8,431	10,319
Total Class/Group Attendance	229,021	272,723

Comparatively few of these visiting groups require or can be given docent service. Nevertheless, 109 guided tours were given by the department for 4,699 students.

SCHOOL LECTURE SERVICE

For twenty years the department has undertaken to give talks and demonstrations of small, tame animals at schools and institutions (such as hospitals) in the New York area. We would, apparently, always be swamped by requests even if our available staff were doubled. In 1963 Miss Linnemann and Miss Perrault made 150 lecture trips, gave 360 talks and (to judge by the enthusiastic letters we received) charmed 72,072 students. Over the past two decades the department's "Zoo Ladies" have addressed more than two-thirds of a million children through this service.

VISUAL AIDS

One of the functions of the department is the time-consuming mechanical work of putting a motion picture film together after the footage has been shot by the Staff Photographer or acquired from some other source. Three films were produced last year: "One Summer Day at the Zoo," "The Water World of the Aquarium" and "Antarctic Laboratory." In May, an arrangement was made with the Trans-Lux Theatre at 49th Street and Broadway to show most of the Society's

films in three-day or four-day runs. Some of them will be shown through 1964.

Miscellaneous

Requests for lectures come to the Zoological Park from a variety of sources—from Boy Scouts to academic groups. The department gave 15 lectures in 1963, as well as making 33 television appearances.

Question House was staffed on a part-time basis and some 5,000 questions were asked—and for the most part answered immediately.

The department staffed and operated the Animal Nursery from April 13 through October 27.

The New Haven Railroad ran four special "Zoo Trains" from New England in the spring and the 5,732 passengers were given material about the Zoo and its exhibits prepared by the department.

In-Service Courses for elementary, junior and senior high school teachers on "Utilization of the Bronx Zoo in the Science Program of Elementary and Secondary Schools" were given for the 27th and 28th time; 39 teachers attended the first and 44 the second course.

Mr. Knobloch and Dr. Dowling again assisted with the judging of science exhibits during the Eighth Westchester Science Fair at White Plains.

CONSTRUCTION AND MAINTENANCE

Charles B. Driscoll, *Superintendent of Operations*

George Russell, *Assistant Superintendent of Construction*

Louis Sanders, *Assistant Superintendent of Maintenance*

It can be readily imagined that in an institution as large as the New York Zoological Park, there is vigorous construction, maintenance and repair activity behind the scenes. In some years a considerable amount of it is performed in the open.

In the past year, as an example, the Park's own forces were much in evidence as we created the South American Llanos exhibit out of the former old—and unsightly—Goose Paddocks. It involved digging additional meandering waterways, new fencing and new landscaping. Nearby the Large Flying Cage was converted to a walk-through exhibit with a 70-foot bridge, entrance and exit ramps and new land-

scaping. Still another improvement was the creation of the Wisent range in the woods along the Jungle Walk. Just south of it, the old Beaver Pond, surrounded by woodland and deserving of the setting it used to have many years ago, was given a face-lifting by removal of the old iron fence, restoring the edge of the pond and grading and reseeding the sides.

By outside contract the Zoobar restaurant was altered to a self-service type of operation.

Capital Budget projects under the Department of Parks included reinforcing electric service in the north half of the Park and demolishing the old Boathouse on the Bronx River.

A few—a very few—of the miscellaneous jobs of the year were setting up a memorial corner in honor of Dr. William Beebe in the Tropical Research Laboratory, creation of a silk screen laboratory and darkroom in the Service Building and brightening with paint in a new color design the arcade between the Small Mammal and Ostrich Houses. By outside contract 5,300 feet of barbed wire were strung on the 182nd Street and Southern Boulevard perimeter fence to deter after-hour visitors. Two-way "walkie-talkie" radios were introduced for use by the animal staff and the night protection force.

Gradually we are acquiring heavy equipment that makes the maintenance work go much faster. This past year we got a new bulldozer and, as a donation, two big rack trucks (one with a power winch and hoist), a compressor and an animal squeeze cage.

Heavily wooded though the Zoological Park is, additional planting is always necessary. Last year we added 375 hybrid rhododendrons, about 150 small evergreens, 300 deciduous shrubs and 150 bamboos.

The position of Park Foreman was filled by Mr. Robert Jungblut, and Mr. John Kolb was promoted to Park Foreman in charge of Maintenance.

FACILITIES DEPARTMENT

Edward Kearney, *Manager*

Edward Quinn, *Assistant Manager*

A more accurate name for the Facilities Department would be "Revenue-producing Facilities Department," for while it does provide those facilities of food and drink, souvenirs and rides, which

the public expects, it is of paramount importance to the whole operation because of the revenues produced by those services. In 1963 the department did a gross business of well over a million dollars—$1,288,625.02, to be entirely exact—and returned $211,646.43 to the Society for the sole purpose of the purchase of animals and improvement of the Zoological Park under the terms of our agreement with the City of New York.

This is approximately $13,000 more than the net of the previous year—a respectable increase, but one that must be bettered year after year as costs mount and the Zoological Park grows and develops. Little, unfortunately, can be done about lifting the aesthetic level of many of the souvenirs sold at our stands; through long and bitter experience we have learned what will sell and what will not!

Automation and cafeteria service are definite advances in our food services. Two new automatic soft drink dispensers poured out some 170,000 soft drinks, mostly during the summer months, and were highly profitable. Discontinuance of table service at the Zoobar restaurant, a losing proposition for years, should make a big difference in the future. The Zoobar has been remodeled as a cafeteria and the dining area will give space for 600 persons; at the end of the year a spring opening could be forecast.

MISCELLANEOUS OPERATIONS AND SERVICES

Children's Zoo. In its twenty-third year of operation, the Children's Zoo had 291,205 visitors, among them an increasing number of school groups.

Tiger Trains. With only three trains available, the "Tiger Train" lecture tours of the Zoological Park had an excellent year, carrying some 45,000 visitors besides many special groups and Members.

Riding Track. Almost operating at capacity, the Riding Track gave 339,096 rides last year.

Farm-in-the-Zoo. In its final year of operation, before being transformed into the Wildlife Survival Center, the Farm-in-the-Zoo had 136,117 visitors, of which 113,808 paid admission. The remainder were accounted for by school classes.

THE AQUARIUM

THE DIRECTOR'S REPORT

CHRISTOPHER W. COATES, *Director*

THE AQUARIUM is still suffering from growing pains, particularly the kind that result from a growing attendance. Interior exhibits are likely to be crowded for some time, but a policy of exhibiting local and cold water animals from other parts of the world in out-of-doors tanks serves to dilute the crowds and increase the scope of the exhibit.

Preliminary plans have been drawn by the architects for a new Marine Biological Laboratory immediately north of the present exhibition hall, a considerable portion of the cost to be contributed by Federal agencies. We aim at occupancy in the fall of 1965.

Also in the design stage is Shark Hall, behind and around the Polar Bay unit. As in any aquarium, the water systems for a complex building require great thought and planning. We are pleased to be able to report that we have found a method of heating or cooling water which seems to be satisfactory. When pure tin heater coils were found to be porous, through the electrolytic action of minute quantities of iron in a colloidal state, we switched to a new material called Karbate, a carbon substance, which is mechanically strong, chemically inert and capable of passing heat without much loss.

Another set of conditions resulting from the high heat and high humidity of an ocean-shore environment had to be overcome in order to exhibit certain North Pacific invertebrates, such as large octopuses and Giant King Crabs. Condensation on the glass windows of cold-water tanks was a serious problem which we believe we have solved in tanks now in preparation.

Two attempts were made to obtain female beluga whales as mates for our two males. One collecting trip produced two calves, one of which succumbed to an ulcer of the first stomach which it carried in the wild, and the other from a heavy infestation of lungworms. In the future we will seek slightly older and better established animals.

The major mammal acquisition of the year was the Weddell Seal of Antarctica, three specimens of which came through a research grant of the National Science Foundation.

Parking should not, perhaps, be considered a normal Aquarium

problem, but our circumstances are such that it very definitely is. Since the Aquarium was opened at Coney Island in 1957, more than 6,500 car parking spaces in the neighborhood have been eliminated. Now an eight-acre plot just north of the Aquarium, long a parking lot and on which we depended for visitor parking when our own facilities were full, is to be the site of two high-rise apartment buildings. This will cost another 1,000 parking spaces within two blocks of the Aquarium and leaves only our own lot and a few metered street spaces.

We have tried many schemes to limit parking on the Aquarium grounds to our own visitors, but space is so scarce that people willingly pay the parking fee and Aquarium admission merely to leave their cars for a few hours. This tends to limit the number of actual visitors on crowded holidays and Sunday afternoons. We are currently trying to devise new ways of parking cars.

AQUARIUM OPERATIONS

Paul L. Montreuil, *Curator*

Carleton Ray, *Associate Curator*

Aage Olsen, *Superintendent*

Jewell Bungay, *Business Manager*

Viability and longevity in the fish collection were markedly improved in 1963, so that acquisitions, particularly in the smaller species and in the invertebrates, were fewer than previously. This accomplishment is partly due to improved dietary control, an extremely difficult problem in marine species, and partly to further improvement in water handling and parasite control. Use of the parasite-picking wrasse, *Labroides dimidiatus,* which is also an efficient wound and abrasion cleaner, was reported last year; its numbers in the tanks are continually being increased and the survival of the species is excellent.

Noteworthy success was obtained with a relatively inexpensive and safe fish anesthetic, quinaldine, a coal-tar derivative which effectively and rapidly puts fishes to sleep. It has been used by collectors and ourselves for underwater collection of fishes otherwise difficult to capture, such as the Yellowhead Jawfish. We have also used quinaldine to safely move large and vigorous fishes, such as Tarpons, from tank

to tank. Ordinarily, Tarpons might be seriously injured or even killed in the attempt to net and move them.

The Collection

This was a moderately heavy year for young tropicals which are found in local waters from the middle of July through early fall. Most of these young fishes result from spawnings south of Cape Hatteras and even as far south as Florida, since adults are not common in our waters. The exact movements of these young, largely tropical, shore species are not well known. Among the more outstanding species brought to the Aquarium by local persons or collected by the staff are the Lookdown, *Selene vomer,* of which we now have three year classes, all collected locally as young; "Threadfish," *Alectis crinitis,* long thought to be a separate species but now known as the young of a gamefish, the African Pompano; the Spotfin Butterfly, *Chaetodon ocellatus;* the Banded Butterfly, *Chaetodon striatus,* rare, even as young, in our waters; the Warsaw Grouper, *Epinephelus nigritis,* which grows to over 400 pounds, but which we get at 3-6 inches; and the Short Bigeye, *Pristigenys alta,* a brick red species with huge, reflecting eyes. Young specimens of many local fishes are also brought to us, such as Kingfish, Northern Puffers, Bergall and the like. Interesting as they are, we have to be extremely careful with these newcomers for fear of infestation of the collection with the gill-attacking parasite, *Oodinium,* common in local waters. Following over-enthusiastic introduction of local young fishes a few years ago, this parasite caused the death of many established individuals in the collection.

As in the past few years, our outstanding tropical collection was constituted through the good offices of Dr. and Mrs. H. Clay Frick in Bermuda in July. It included 125 individuals of 31 species and contained the outstanding assortment of parrotfishes, large and small, which we have come to expect from Dr. Frick's diver-seine technique, undoubtedly the safest and best parrotfish collecting method yet devised. Dr. Frick has even been experimenting with the use of drugs and tranquilizers for the handling of these highly nervous fishes. While we are extremely desirous of exhibiting the showy parrotfishes, we are still not completely able to satisfy their peculiarities of diet or requirements for space. Other outstanding fishes collected were a large adult male Hogfish, *Lachnolaimus maximus,* more than two feet long; large Green Morays, *Gymnothorax funebris;* and many smaller butterflyfishes and grunts, squirrelfish, boxfish, cowfish and porcupinefish.

We are again indebted to the Sunrise Fish Company of Islip, Long Island, for allowing us to collect several species of larger local fishes

from their pound nets off Fire Island. The pound net method of fish collection is the gentlest we know of and these ocean pounds are the last to be found in local waters, though a few smaller inshore pounds are still in operation.

Shipment of fishes and invertebrates came to us both from local wholesalers and other aquariums in the United States and Canada. The former can supply only smaller individuals, usually under four inches, and we have received a wide assortment of colorful and interesting forms. Such shipments resulted in a spectacular "ecologic" exhibit of invertebrates.

Other aquariums contributed larger and mostly cold-water fauna. In April the Seattle Marine Aquarium, in association with Dr. Ray, scuba-collected and shipped giant sea stars of up to two and a half feet across, some extremely large "Powder-puff" anemones, orange and white and up to 18 inches high, and other fishes and invertebrates. In July the Vancouver Public Aquarium sent a similar assortment. Waters along the northwest coast of the United States and Canada contain the world's largest and most varied sea stars and, surprisingly for cold waters, the fishes and invertebrates are extremely colorful, rivaling tropical species, in contrast with the much more drab but related varieties found locally and in eastern Canada. Final shipments representing this outstanding fauna were received in July from the Seattle Marine Aquarium and from the Wakefield Fisheries, Alaska, in June and December. From the latter we received Giant King Crabs, *Paralithodes camschatica,* spanning 4-4½ feet.

Our eastern collection was significantly increased by a shipment from the Quebec Aquarium in October, including sea ravens, Atlantic Salmon, eels, sturgeons, hagfishes, cod and flatfishes. We especially welcomed the spectacular Halibut, *Hippoglossus hippoglossus,* which grows to a weight of several hundred pounds.

Traffic was not all in one direction. Killies were sent to Dr. Brown Dobyns at Cleveland Memorial General Hospital for exophthalmic studies for the third year. Other fishes have been sent to Marineland of the Pacific, the Aquarama in Philadelphia, The Quebec City Aquarium and the Seattle Marine Aquarium.

To summarize: there are plenty of fish in the sea and it will be only through continued expansion of our extremely limited facilities that the New York Aquarium can become the "world" aquarium which it should be.

Marine Mammals

This was the first year in which we could boast the display of marine organisms from every ocean. The species which brought us

to this state was the gentle and spectacular Weddell Seal, *Leptonychotes weddelli.* Its arrival in November resulted from a National Science Foundation grant for the study of the physiological ecology of this species in McMurdo Sound, Antarctica, in which the Principal Investigator was Dr. Ray. We are hoping to continue the Society's association with the National Science Foundation and, if so, can be assured of other interesting Antarctic animals for exhibition and study in the future.

Marine mammals continue to lead our collection both in time consumption and rarity. At year's end, the Aquarium had 20 individuals of 12 species and subspecies, still the most varied collection extant. Additions were made and losses suffered; on the whole, a good deal was learned about the biology of these least-known of all mammals. In the field of marine mammals, it may be truthfully said that we are at a stage analogous to that which prevailed 50 years ago in the keeping of great apes. In our seven-year history of experience with marine mammals, particularly the Arctic and sub-Arctic species, we have solved many of the problems of collection and shipment and have devised methods of nutrition for infant pinnipeds that are now widely used and which for the first time give in captive infants growth rates equivalent to growth in the wild. We are on the way to gaining insight into some peculiar and seemingly unique vitamin and mineral requirements.

The collection was enlarged by the following: two male pup Richard's Harbor Seal shipped last summer by Richard Zinsman of Anchorage, Alaska; a male Siberian Harbor Seal, a pair of calf walrus, a male pup Ribbon Seal and a male pup Ring Seal resulting from a collecting trip to St. Lawrence Island by Dr. Ray; two young Belugas from the St. Lawrence River collected by Curator Montreuil and Dr. Ray in collaboration with the Quebec Aquarium; and three Weddell Seals as mentioned above.

Losses were: a Ribbon Seal of respiratory infection; a Harp Seal of probable dietary deficiency and respiratory complications; another Harp Seal which had swallowed coins thrown into its pool by visitors, causing severe ulceration and gastritis; a Hooded Seal of a parapharyngeal abcess; a Ringed Seal with calcified nodes in the lungs; a walrus of a persistent and recurring tusk infection; a Beluga Whale of lung worms, chronic in this individual in nature; and another Beluga of generalized septicemia resulting from a wound suffered in capture, complicated by a stomach abcess which it also had sustained in nature. We do not, of course, like to recall these losses, but they are enlightening. Marine mammals do sustain disease in

nature and mortality is known to be high in their first years under natural conditions. Both Belugas were examples of animals in poor condition in nature which, when brought here, could not be saved. The treatment of cetaceans is particularly difficult since handling out of water, a necessity in most cases, induces severe stress conditions which often worsens the animal's condition. Marine mammals are also quite susceptible to various diseases, particularly of the respiratory tract, and we suspect that this is because disease organisms of the kind met in big cities are very rare or absent in their habitats. Inevitably there are hazards to these animals in captivity from visitors who toss objects into their pools; these are eaten and have resulted in the deaths of half a dozen animals at the Aquarium. A further difficulty results from a particular habit which an animal may have, such as the tusk-wearing of walruses and tooth-wearing of Weddell Seals, both of which make for certain construction problems in their enclosures.

That these problems are worth solving is obvious, for the animals are of great interest to our visitors and the specialized biologic interest in marine life is expanding. "Olaf," our eight-year-old walrus, weighs an estimated 2,500 pounds, is the world's largest in captivity and is still only on the verge of maturity. "Alex," the Alaskan Beluga, now about nine and a half feet long, is the first of his species ever to grow at all in captivity, to our knowledge. He came to us at a little over seven feet in late August, 1961, and holds the longevity record for his species in captivity. The Aquarium's large seal collection is assuming some scientific importance in the investigation of underwater acoustics. The first study of this sort on hair seals was performed at the Aquarium early in the year by our staff in cooperation with the Woods Hole Oceanographic Institution.

Attendance and Facilities

Monthly attendance at the New York Aquarium for the year 1963 was as follows:

January	10,094	July	50,463
February	13,130	August	62,306
March	24,777	September	22,955
April	33,556	October	16,871
May	37,550	November	15,431
June	45,841	December	8,363

Total: 341,337

All revenue-producing facilities showed a substantial profit for the year. On busy days our present Parking Field was inadequate and

we plan to fence property at the east end of the Aquarium as a cinder-top Parking Lot for the 1964 season.

Because of space limitations, the Aquarium could not accommodate all school classes wishing to visit the Aquarium. Under a new policy initiated in September, only classes at the 6th grade level and above are admitted during the school year on school days free of charge.

Publications

Mr. Coates

Demoiselle. *The Encyclopedia Americana,* 1963 Ed., Vol. 8, 670.

Weekly column on tropical fishes in the *New York World-Telegram and Sun.*

Dr. Ray

Locomotion in pinnipeds. *Natural History Magazine,* March, 73 (3): 10-21.

Transporting small fishes. *Underwater Naturalist,* 1 (2): 12-14.

The Yellow Jawfish. *Animal Kingdom,* 66 (2): 42-46.

Weisse Wale aus Alaska. *Das Tier,* 3 Jahrgang (6): 4-8.

Underwater sounds of pinnipeds. With William E. Schevill and William A. Watkins. *Science,* 141 (3575): 50-53.

The scientific need for shallow-water marine sanctuaries. Synopsis. In: *Proc. XVI Intl. Congr. Zool.,* Vol. 3: 406-411.

Wonders of the Living Sea. Home Library Press.

Dr. Nigrelli

Metabolites of the Sea. *BSCS Pamphlets,* 7. American Institute of Biological Sciences, Biological Sciences Curriculum Study. Published by D. C. Heath & Co., Boston, March, 1963. 35 pp.

Pathology of fish diseases. Discussion. *Proceedings, 1st International Conference of Wildlife Diseases,* High View, New York. June 24-27, 1962. Published in August, 1963, by Wildlife Disease Association (Microcards).

Renal excretion of tetracycline in the Aglomerular Toadfish, *Opsanus tau. Proc. Soc. Exp. Biol. & Med.,* Vol. 114: 582-84. (With Dr. George M. Fanelli, Jr., Harvard Medical School).

Spontaneous tuberculosis in fishes and in other cold-blooded vertebrates, with special reference to *Mycobacterium fortuitum* Cruz from fish and human lesions. *Zoologica,* 48: 131-144. (With Dr. Henry Vogel, Bureau of Laboratories, N. Y. City Department of Health).

The possible presence of an abnormal nucleic acid in the sponge *Cryptotethya crypta. J. Histochemistry & Cytochemistry,* Vol. 11: 395-400. (With Martin F. Stempien, Jr.).

Dr. Stempien

The use of barium chloride-sodium rhodizonate technique for the histochemical localization of some sulphated mucopolysaccharides. *J. Histochemistry & Cytochemistry,* Vol. 11: 478-481.

Vincent Liguori, M.S.

Antibiotoic and toxic activity of the mucous of the Pacific Golden Striped Bass *Grammistes sexilineatus. American Zoologist,* Vol. 3. (With G. D. Ruggieri, S.J., M. H. Baslow, M. F. Stempien, Jr., and R. F. Nigrelli).

G. J. Rio, M.S.

Saponin-like toxin from the giant sunburst starfish, *Pyncopodia helianthoides,* from the Pacific Northwest. *American Zoologist,* Vol. 3. (With G. D. Ruggieri, S.J., M. F. Stempien, Jr., and R. F. Nigrelli).

Dr. Baslow

Memory, enzyme induction. *Science.* Vol. 139, 1963. Letters to the editor.

The distribution of neurosine, a histidine containing oligo-peptide within the nervous system of *Rana pipiens* and *Fundulus heteroclitus. American Zoologist,* Vol. 3, No. 265.

The enzymatic degradation of neurosine as an index of fish quality. *American Zoologist,* Vol. 3, No. 266.

Dr. Goreau

Calcium carbonate deposition by coralline algae and corals in relation to their roles as reef builders. *Ann. N. Y. Acad. Sci.,* 109: 127-167.

Boring sponges as controlling factors in the formation and maintenance of coral reefs. In: *Mechanisms of Hard Tissue Destruction,* Publ. No. 75 AAAS, pp. 25-54. (With Dr. Willard D. Hartman).

Dr. Kallman

Secretion of thyrotrophic hormone by pituitary transplants in a teleost fish. *Nature,* 199: 618-620. (With John Ball and Madeleine Olivereau).

Effects of hypophysectomy on *Xiphophorus. American Zoologist,* 3 (4). (With Martin Schreibman).

The effect of hypophysectomy and pituitary implants on the peripheral blood picture of *Mollienesia formosa. American Zoologist,* 3 (4). (With Anna M. Slicher & John N. Ball).

Population structure of the all-female gynogenetic teleost *Mollienesia formosa* Girard. *Proceedings XVI International Congress of Zoology,* Washington, D. C. Vol. 2, 170.

Position effect as a factor in the production of melanosis and melanoma in the fish *Xiphophorus. Proceedings XVI International Congress of Zoology,* Vol. 2, 206. (With James W. Atz & Ross F. Nigrelli).

Personnel

Director Coates attended the Annual Meeting of the American Institute of Park Executives in Washington in September. He was reappointed Advisory Editor on Ichthyology for *The Encyclopedia Americana.*

Mr. Paul L. Montreuil, formerly Director of The Quebec City Aquarium, became Curator, replacing Dr. James W. Atz who left the Aquarium in February to engage in scientific editorial work and writing.

As Secretary to the Bahamas National Trust, Dr. Ray attended a meeting of its Executive Committee in Nassau in February. He gave a National Geographic Society lecture in Constitution Hall in Washington on the collection and maintenance of walruses and white

whales by the Zoological Society, was a member of a panel on "Practical Problems" at the First International Symposium on Cetacean Research, and spoke on "The Scientific Need for Shallow-Water Marine Sanctuaries" at the XVIth International Congress of Zoology. In October-November, he was Principal Investigator for the Society at McMurdo Base, Antarctica, studying the physiological ecology of the Weddell Seal.

Dr. Goreau participated in a conference on "Palaeoecology of Marine Carbonate Sediments" in Bermuda. He gave a series of seminars and lectures at Rice University (Texas), before the Biology Branch of the Office of Naval Research in Washington and to the staff and students in the Departments of Zoology at Yale University, the Hebrew University in Jerusalem and Tel Aviv University.

Dr. Stempien attended the 146th national meeting of the American Chemical Society in New York.

Dr. Kallman attended the International Congress of Zoology in Washington and gave a seminar in the Department of Biology of Marquette University in Milwaukee.

Lectures given by Dr. Nigrelli during the year were:

"Metabolites of the Sea." American Littoral Society, New York branch.

"Role of Veterinarians in Fishery Sciences." New York City Veterinary Society.

"Minerals and Drugs from the Sea." Soroptimist Club of New York.

"Biological Research in the New York Aquarium." Glen Rock, N. J., High School.

"Drugs from the Sea." Industrial Veterinarians.

"Biological and Biochemical Activities of the Marine Environment." Study Section, Environmental Sciences and Engineering, U. S. Public Health.

"Potential Drugs from the Sea." Columbia-Presbyterian Alumni.

"Biological, Biochemical and Biophysical Studies on Aquatic Organisms at the New York Aquarium." Graduate students in physical sciences of the Rockefeller Institute.

Dr. Nigrelli was given the Order of Merit of the Société d'Encouragement pour la Recherche et l'Invention of France.

Mr. Wells P. Owen was added to the research staff as Technical Assistant in Biochemistry to Dr. Stempien. Miss Johanna van de Kerkhoff was engaged as general technician in the Laboratory.

At the Lerner Laboratory of the American Museum of Natural History in Bimini, Dr. Nigrelli collected sea cucumbers for enzymatic studies on biosynthesis of the sugar components of holothurin. He also attended meetings of the Federation of American Societies for Experimental Biology in Atlantic City, where he became a founding

member of the International Society of Toxicology; the American Society of Ichthyology & Herpetology at the University of Vancouver, where he presented a paper on "Tuberculosis in Aquarium Fishes;" the XVIth International Congress in Zoology in Washington; the American Institutes of Biological Sciences at the Massachusetts State University in Amherst; and a symposium on experimental marine biology held by the Graduate School of the University of Rhode Island, where he was chairman of the session on biochemistry of marine organisms.

RESEARCH AND REPORT OF THE LABORATORIES

Aquarium Laboratory. Ross F. Nigrelli, *Pathologist;* Dr. William Antopol, *Pathologist,* Beth Israel Hospital, Fellow, N.Y.Z.S., and Research Collaborator; Johanna van de Kerkoff, *Technician.*

1. *Pathological Studies of Fishes.* The mortality rates of the established population of fishes in the Aquarium, *i.e.,* fishes that have been in captivity for six months or more, remained relatively low. A few deaths among the older population occurred in January due to an outbreak of oodiniasis. A shipment of California Sea Horses was heavily infected with microsporidiosis, and a collection of small hogfish from Bermuda developed a heavy gill infestation of *Microcotyle.*

Studies were continued on tuberculosis in fishes, a subject in which interest has been renewed by the discovery that certain tubercular lesions in humans are caused by acid-fast bacteria occurring in swimming pools. Most recently, tuberculosis was found in three species of the South American cyprinodonts of the genus *Cynolebias* and in a striped bass caught in Long Island Sound. The Laboratory now has an extensive culture collection of tuberculosis organisms from fishes, some of which are similar to atypical mycobacteria producing human lesions.

In collaboration with Dr. L. Edgar Lee, Department of Pathology, Yale University Medical School, studies on hepatomas and other liver lesions in the rainbow trout were continued.

Several of the jawfish on exhibition developed massive goiters, bordering on adenomas. The histopathology and genesis of these tumors are also being investigated in collaboration with Dr. Lee.

Analysis of extremely heavy fish kills in a reservoir of the Hackensack Water Co. in New Jersey and in the large lake at the World's

Fair were made for the New Jersey State Conservation Department and the Park Department of New York City. In both instances deaths were attributed to abnormal environmental conditions.

2. *Pathological Studies on Marine Mammals.* A small female beluga died of an extensive infection of the lungs complicated by a heavy infestation of lung worms. In March, "Tipuk," a two-year old female walrus, developed a severe purulent rhinitis caused by hemolytic streptococcus and two strains of coliforms. Antibiotics temporarily controlled the condition but later in the summer infection reappeared. Focus of the infection was probably her tusks, which she had ground down. Attempts to anesthetize her in August in order to treat and cap the infected tusks proved fatal.

In the fall, "Sapiunuk," the baby walrus captured in Alaska in the spring, developed a series of symptoms characterized by vomiting, loss of appetite and loss of weight, which left her in an extreme weakened condition. On the evening of November 14 her condition was critical. Consultation with Dr. Lee and Dr. Asa Barnes of the Yale University School of Medicine, who happened to be at the Aquarium, led to the suggestion that the animal was probably suffering from an acute electrolyte imbalance, brought about by the pernicious vomiting, and possibly from a renal shutdown. An immediate subcutaneous clysis of normal saline was proposed. A quantity of saline was obtained on an emergency basis from Coney Island Hospital and was administered all through the night. The following day Sapiunuk was moved to the Zoological Park for X-ray investigation of a possible gastro-intestinal obstruction. Sapiunuk's recovery was uneventful; during the next few days she took copious amounts of water and some food and in subsequent weeks gained weight normally.

Several deaths occurred among our marine mammals and although lesions of various kinds were present, all deaths were directly attributed to pneumonia of non-specific etiology. Consideration is now being given to the possible role of toxic substances produced by *Aspergillus flavus,* a ubiquitous mold with lethal propensities.

A detailed histo-pathological analysis of all vital organs of the cetaceans and pinnipeds that died in the collection during the year is being made by Dr. Antopol and his staff at Beth Israel Hospital in cooperation with Dr. Ray.

Laboratory of Marine Biochemistry and Ecology. Ross F. Nigrelli, *Director of Research*; Martin F. Stempien, Jr., *Senior Investigator and Research Associate*; Morris H. Baslow, *Research*

Associate; Vincent Liguori, *Research Assistant*; Guido J. Rio, *Research Associate;* Wells P. Owen, *Technical Assistant;* George D. Ruggieri, S. J., *Visiting Research Associate.*

Work on the pharmacological activities of metabolites from marine organisms, supported by a three-year grant from the John A. Hartford Foundation, has been accelerated.

Some inroads were made on the pharmacology, chemistry and toxicity of several species. Chemical studies were concentrated on a species of green sponge obtained from Bermuda though the efforts of Dr. Frick. This species shows both toxic and broad spectrum antibiotic activity and attempts are being made to isolate the substance responsible for each property.

Further biological and pharmacological studies on Bonellin, the growth-inhibiting and male sex-determining factor found in the mature female *Bonellia,* were carried out in our laboratory and by Dr. Pierre Tardent at the University of Zurich. Attempts were made to isolate the heat stable and heat labile portions of the substance which were previously reported by us, but because of the relatively small amounts of active material on hand, much of this work had to be postponed to next year when it is planned to make a large collection of the marine worms from which the extracts are derived.

Histochemical studies were made on the Bahamian sponge *Cryptotethya crypta* to clarify the presence or absence of typical ribose nucleic acid (RNA). The results, published in the *Journal of Histochemistry & Cytochemistry,* lend additional evidence that this sponge does indeed contain an abnormal nucleic acid which is suspected to be arabinose nucleic acid. This part of the work was supported by a grant from the Damon Runyon Memorial Fund for Cancer Research and is now being studied further with the support of the John A. Hartford Foundation Fund.

Our contention that holothurin or holothurin-like substances may be present in all classes of echinoderms appears to have gained additional support when investigations on a variety of starfish from local waters and those obtained in the Pacific showed that these toxic steroid glycosides are present in varying degrees of concentrations and toxicity.

Antibiotic screening was carried out on extracts derived from a variety of marine invertebrates, revealing additional species of marine animals as potential sources. These were processed during the year and the more striking ones were prepared for purification and chemical identification.

Dr. Baslow's research on the distribution and chemistry of neurosine and other new imidazole compounds in the nervous system and electric tissues of fish and other animals were continued. Attempts were made to isolate relatively large amounts of neurosine from the brains of menhaden for analysis of molecular structure and to determine its possible physiological role. A number of imidazole compounds, some of them new, have also been extracted and partially characterized chemically from cyclostomes, elasmobranchs and bony fishes. The new compounds are chromatographically different from histidine, histamine, carnosine, homocarnosine, norcarnosine and others, all of which have been previously isolated from fish tissues.

Laboratory of Fish Genetics. KLAUS D. KALLMAN, *Principal Investigator and Research Associate;* JUDITH FROMOWITZ KALLMAN, *Research Assistant;* DR. MARTIN SCHREIBMAN, *Visiting Research Associate.*

Research was concerned primarily with sex determination in the platyfish, *Xiphophorus maculatus,* the only vertebrate known to have two types of sex determination. During 1963 platyfish were collected from six localities in northern Guatemala and British Honduras, where platyfish had never before been taken alive, but where it was postulated that fishes with the two types had to meet.

In order to determine the sex chromosome mechanism of the wild-caught fish, more than 200 crosses with fish of known sex chromosomes were set up, resulting in approximately 10,000 offspring which were all raised to maturity. The results indicate that in five of the six locations both sex determining mechanisms occur side by side. In the laboratory, fish of one type will readily mate with fish of the other kind, but more field work will be necessary to determine whether this also takes place in nature. More than forty males, when mated to certain females, produced over 1,200 offspring, all males.

In the course of the collecting trip, which was a joint venture of the Zoological Society and the American Museum of Natural History, a new sub-species of the swordtail, *Xiphophorus hellerii,* was discovered and brought back alive. Another swordtail, *X, milleri,* not previously brought to New York, was added to our stock of xiphophorin fishes.

Dr. Schreibman developed a technique to hypophysectomize platyfish and swordtails, a considerable aid in studying the role of the pituitary gland in the origin of pigmented tumors in platyfish-swordtail hybrids. Hypophysectomized fish will be injected with purified pituitary hormones in order to determine the specific action of each one.

Physiology of Coral Reefs. Thomas Goreau, Department of Physiology, University College of the West Indies, and *Principal Investigator;* Nora I. Goreau, *Research Associate,* Coral Reef Project; E. L. Boehm, *Special Research Assistant;* Ross F. Nigrelli, *Consultant.*

More exact determination of the methods by which calcium carbonate deposition is brought about by reef-building coralline algae and corals was made by use of radioactive isotopes of carbon and calcium. (14_C and 45_{Ca}). These studies were carried out in the Physiology Laboratory at the University College of the West Indies and on the reefs on the north coast of Jamaica. During the summer, in collaboration with Dr. C. M. Yonge of Glasgow University, and Drs. U. Saffriel of the Hebrew University in Jerusalem and J. Neumann of Tel-Aviv University, Dr. Goreau and Mrs. Goreau continued their research on photosynthesis and calcification in reef corals and algae in the Red Sea at Eilat, Israel. They also examined the relation of zooxanthella, algae that live symbiotically with the well-known giant bivalve mollusk *Tridacna* and another but less known species *Xenia,* to the total physiology of the animal, a question that has puzzled marine zoologists.

Marine Fouling Laboratory. Arnold Freiberger, *Materials Engineer;* Christopher Coleger, *Materials Engineer;* Giacomo Liberatore, *Biologist;* Ross F. Nigrelli, *Consultant.*

The laboratory in the filter building attached to the Oceanic Pool was reorganized for isolating, growing, and keeping larval stages of barnacles for testing of anti-fouling compounds for the U. S. Naval Applied Science Laboratory. Winter observations suggest that the shedding and hatching of barnacle larvae in and around Coney Island may be directly related to several diatom blooms noticed in the area during this period.

General Staff

Mr. Montreuil continued his detailed analysis of the Acanthocephala of the gastro-intestinal tract of northern seals.

Dr. Ray continued his long-range studies on the nutrition, growth, behavior, locomotion, physiological ecology and pathology of Cetacea and Pinnipedia, both at the Aquarium and in the field.

Collaborators and the Nature of Their Collaborations with the New York Aquarium

Dr. William Antopol, Director, Pathology Department, Beth Israel Hospital, New York. Diseases and pathology of cetaceans and other marine mammals.

Dr. Herman Baker, Department of Physiology, Seton Hall Medical College, Jersey City. Bioassay of vitamins and amino acids in trout liver tumors.

Dr. John N. Ball, University of Liverpool, England. Pituitary of poeciliids.

Idelisa Bonelly Calventi, M.S., Director, Marine Biological Institute of the Dominican Republic, Santo Domingo. Collection of sponges and other invertebrates for biochemical studies.

Dr. Ion O. Cocioba, Beth Israel Hospital. Microbiology of pinnipeds.

Dr. Francis H. Fay, Arctic Health Research Center, Anchorage, Alaska. Temperature regulation, nutrition and growth of walruses.

Elmer T. Feltz, Arctic Health Research Center. Microbiology and virology of pinnipeds.

Dr. George H. Fried, Beth Israel Hospital. Enzymology of pinnipeds.

Dr. Robert W. Harrington, Jr., Entomological Research Center, Vero Beach, Florida. Hermaphroditic *Rivulus*.

Dr. Eli Goldsmith, New York University Dental College. Effects of holothurin on various biological systems.

Dr. John Kilby, University of Florida. Parthenogenesis in fishes.

Dr. Milan J. Kopac, Professor of Biology, New York University. Biophysics and biochemistry of pigment formation in health and neoplastic diseases of fishes.

Lt. David O. Lavallee, USN. Underwater technology and sound production of pinnipeds.

Dr. L. Edgar Lee, Yale University Medical School. Pathology of fishes.

Dr. John J. A. McLaughlin, Haskins Laboratories, New York. Analysis of "red-tide"-producing toxic dinoflagellates.

Dr. Robert R. Miller and R. Jack Schultz, Museum of Zoology, University of Michigan. Gynogenesis in fishes.

Dr. David Nachmansohn and associates, Department of Biochemistry and Neurology, College of Physicians and Surgeons, Columbia University. Electrophysiology of Electric Eel and other fishes.

Dr. Nezihe Oztan, University of Istanbul. Cytology of pituitary and thyroid tumors in fishes.

Dr. Morton Padnos, Waldemar Medical Research Institute, Port Washington, N. Y. Serological studies of starfishes.

Dr. George D. Ruggieri, S.J., Woodstock College, Md. Effects of toxic metabolites from marine organisms on embryological development.

William E. Schevill, Woods Hole Oceanographic Institution. Sound production of pinnipeds.

Dr. Martin P. Schreibman, Brooklyn College. Pituitary of poeciliids.

Dr. Harry Sobotka and associates, Department of Chemistry, Mount Sinai Hospital, New York. Chemical characterization of holothurin.

Dr. Horace Stunkard, American Museum of Natural History. Parasitic worms in fishes and other aquatic animals.

Dr. Pierre Tardent, University of Zurich. Embryological effects of Bonellin.

Dr. Henry Vogel, Bureau of Laboratories, Department of Health, New York. Tuberculosis in fishes and other cold-blooded animals.

Census of the Aquarium December 31, 1963

Orders		*Species & Subspecies*	*Specimens*
Phylum Chordata			
Class Chondrichthyes—Sharks, Rays and Chimeras			
Squaliformes	Sharks	2	7
Class Osteichthyes-Bony Fishes			
Acipenseriformes	Sturgeons	1	1
Amiiformes	Bowfins	1	1
Clupeiformes	Tarpon, Herring, etc.	2	5
Cypriniformes	Catfishes, Minnows	9	22
Anguilliformes	True Eels	6	11
Cyprinodontiformes	Killiefishes	2	100
Gadiformes	Codfishes, etc.	2	3
Gasterosteiformes	Sticklebacks, Pipefishes, Seahorses, etc.	1	4
Beryciformes	Squirrelfishes, etc.	2	10
Perciformes	Perch-like Fishes	74	237
Pleuronectiformes	Flatfishes	2	16
Echeneiformes	Remoras	1	1
Tetraodontiformes	Trunkfishes, Trigger Fishes, Puffers, etc.	4	7
Batrachoidiformes	Toadfishes	1	16
Class Reptilia—Reptiles			
Testudines	Turtles	4	8
Class Aves—Birds			
Sphenisciformes	Penguins	1	9
Class Mammalia—Mammals			
Pinnipedia	Seals, Sealions and Walruses	11	18
Cetacea	Whales	1	2
Phylum Porifera—Sponges		2	100
Phylum Coelenterata			
Class Anthozoa—Corals and Anemones		8	78
Phylum Annelida			
Class Polychaeta—Marine Worms		1	100
Phylum Arthropoda			
Class Crustacea—Lobsters, Shrimp, Crabs, etc.		3	13
Class Arachnida—Spiders, Horseshoe Crabs		1	2
Phylum Mollucsa			
Class Gasteropoda—Snails		1	50
Class Pelecypoda—Oysters, Clams, etc.		1	12
Class Cephalapoda—Octopus, Squids		1	1
Phylum Echinodermata			
Class Asteroidea—Starfishes		7	53
Class Holothuroidea—Sea Cucumbers		1	2
	Totals	151	889

Summary: Species & Subspecies, 151; Specimens, 889.

GENERAL ACTIVITIES

DEPARTMENT OF TROPICAL RESEARCH

Jocelyn Crane, *Director*

Associates:

Jane Van Z. Brower; L. P. Brower; William G. Conway;

Julie C. Emsley; Michael G. Emsley; William K. Gregory;

Donald R. Griffin; David W. Snow; John Tee-Van

The department's work during 1963 continued to be centered in Trinidad at Simla, the William Beebe Station for Tropical Research.

Research involved enough kinds of animals to stock a unique if minor zoo. Tanagers with crimson feathers and silver beaks played important parts. So did seven kinds of swifts and fifteen hummingbirds. Bats, of which 60 species live on the island, occupied three groups of zoologists. Although this year the snakes and frogs enjoyed limited peace, invertebrates as always drew warm appreciation. Most favored for research were bees, flies, butterflies, moths, bugs and crabs, all of which abound near Simla.

In each case, of course, these animals did not add to old-fashioned collections of tropical specimens. Instead they were selected for study because they were appropriate for research on particular problems and because, at Simla, they were plentiful.

Each of the year's studies lay in the fields of social behavior, bioacoustics, sensory physiology, ecology, or some aspect of evolutionary biology. Sometimes, as with the butterfly work, several subjects were studied at once by different specialists working on the same species, with a coordinated plan.

Academic Associations

The Station is now informally associated, through research programs of faculty members and their students, with Amherst College and with the universities of Florida, Harvard, Lehigh, Liverpool, London, Oxford and the West Indies. This list does not include the academic affiliations of scientists who have worked at Simla only during short visits. It indicates rather those zoologists, senior and

junior, with programs continuing through several seasons. All of these associations are on a mutual basis. Often equipment and facilities, variously financed, are shared in a way helpful to all concerned.

Since academic obligations usually confine faculty stays in Trinidad to the summer months, one of Simla's duties has been to dispatch research material to our associates in the north, to start or maintain experimental stocks at Simla and to construct new facilities. These winter undertakings are growing and important. Obviously, summer workers accomplish more if they can start more promptly to work on their favorite problems.

Perhaps most important, an increasing number of graduates and undergraduates are involved in these programs. In a day of emphasis on molecular biology, students work for a time with whole animals, in close relation to a lavish natural environment. Recently academic interest seems once more to be surging in both evolutionary and tropical aspects of biology. Simla's unchanged basic emphases are therefore timely and needed.

Personnel

Simla's principal workers and their subjects during the year were the following, grouped alphabetically under the name of the zoologist in charge of the program.

Dr. L. P. Brower, Amherst College. Comparative study of mimicry and polymorphism in butterflies. *Associate:* Dr. J. Van Z. Brower. *Assistants:* H. Croze; G. Stiles; A. Howard. Dr. Brower's work was in part correlated with Miss Crane's below.

C. L. Collins, University of Florida. Comparative physiology and ecology of Trinidad swifts; observations on other birds, in continuation of Dr. D. W. Snow's earlier work at Simla.

J. Crane, New York Zoological Society. Comparative biology of heliconiine butterflies. *Associates:* In genetics, Professor P. M. Sheppard, University of Liverpool; in morphology, M. G. Emsley, University of the West Indies; in sensory physiology, S. L. Swihart, Lehigh University. *Assistants:* scientific artist and chief laboratory assistant, J. C. Emsley; laboratory assistants, K. Campbell, C. Lai-Fook and T. Lai-Fook.

Professor D. R. Griffin, Harvard University. Echolocation and neurophysiology in fish-eating and other bats. *Assistants:* R. Suthers; A. Graybiel.

Professor T. Mitchell, University of North Carolina. Comparative biology of leaf-cutting bees.

Dr. P. Krutzsch, School of Medicine, University of Pittsburgh.

Comparative reproductive physiology of bats. *Assistant:* Dr. W. Stinebring.

Dr. D. Pye and Dr. A. Pye: Institute of Laryngology and Otology, University of London. Bio-acoustics of bats and moths. *Assistant:* M. Flinn.

Granting agencies supporting one or more of the above programs included, in addition to the New York Zoological Society, the National Science Foundation, the National Institute of Health, the Office of Naval Research, The Chapman Memorial Fund, Amherst College and the University of the West Indies.

A number of welcome scientific guests stayed briefly at Simla, either to become acquainted with the Station or to work on problems needing only short stop-overs. Among them were Professor T. Dobzhansky of the Rockefeller Institute; Dr. W. Lanyon, Department of Birds, American Museum of Natural History; Professor E. Mayr, Director of the Museum of Comparative Zoology at Harvard; Mrs. Mayr; and Dr. C. Potter, University of Durham.

Field Trips

Associate M. Emsley made two field trips to Ecuador on behalf of the butterfly work. On the first trip in April, he was aided by Mrs. Emsley. The second trip was made in July and became somewhat extended owing to a minor revolution. Nevertheless, both voyages were a success, with the desired broods successfully established at Simla, and later crossed with local forms. The trips were financed by the National Science Foundation and the University of the West Indies.

Five weeks, centering in May, were passed by Miss Crane in east Asia and Australia, completing field work on fiddler crabs. Stops averaging a week each were made in West Australia, Hong Kong, Taiwan and south Japan. This trip was partly financed by the Society's Vose Fund.

In December another phase of the crab work was completed in European museums, through funds furnished by the Society's Madison Grant Fund. In the course of this trip arrangements were also made for expanded activities of the Department planned for 1964.

Gifts

Special contributions to Simla provided furnishings for the Station's living quarters which would not otherwise have been possible. These gifts, from Mr. and Mrs. Charles Erdman and from Mr. and Mrs. Bernard Heineman, were much appreciated.

Construction and Maintenance

Hurricane Flora, raging out-of-bounds, damaged Simla's trees, waterpipe and driveway, but necessary repairs were minor.

The Society's grant from the National Science Foundation for butterfly research financed an important project destined to be of use to many kinds of workers. This accomplishment is the Constant Temperature Room, designed by Dr. Brower, and appropriately equipped. Such an installation, functioning within sound of nesting tinamou and bellbirds, would, until recently, have been impossible.

Two lofty new insect cages, a flight cage for birds and numerous smaller quarters were built to deal with our expanded programs. The first two, designed jointly by Dr. Brower, Professor Sheppard and Miss Crane, were financed wholly through Amherst's grant for Dr. Brower's work from the National Science Foundation. Like the Constant Temperature Room, the cages are used by various investigators. Known as Skyscraper North and Skyscraper South, they would dominate Simla were it not for the surrounding trees. Fortunately, our mahoganies are still unchallenged.

Contributions, 1963

1036. The Display of the Orange-Headed Manakin. D. W. Snow. *Condor,* Vol. 65, No. 1, pp. 44-48, 1963.

1037. The Natal Pterylosis of Tanagers. Charles T. Collins. *Bird Banding,* Vol. 34, No. 1, pp. 36-38, January, 1963.

1038. Weights and Wing-Lengths of some Trinidad Birds. D. W. Snow & B. K. Snow. *Zoologica,* Vol. 48, pp. 1-12.

1039. Breeding and the Annual Cycle in Three Trinidad Thrushes. D. W. Snow & B. K. Snow. *Wilson Bulletin,* Vol. 75, No. 1, pp. 27-41, April, 1963.

1040. Experimental Studies of Mimicry. 7. Relative Palatability and Müllerian Mimicry among Neotropical Butterflies of the Subfamily Heliconiinae. L. P. Brower, Jane Van Zandt Brower & Charles T. Collins. *Zoologica,* Vol. 48, Part 3, pp. 65-84.

1041. A Morphological Study of Imagine Heliconiinae (Lep: Nymphalidae) with a Consideration of the Evolutionary Relationships within the Group. Michael Emsley. *Zoologica,* Vol. 48, Part 3, pp. 85-130.

1042. Some Genetic Studies of Müllerian Mimics in Butterflies of the Genus *Heliconius.* P. M. Sheppard. *Zoologica,* Vol. 48, Part 4, pp. 145-154.

1043. The Electroretinogram of *Heliconius erato* (Lepidoptera) and Its Possible Relation to Established Behavior Patterns. S. L. Swihart. *Zoologica,* Vol. 48, Part 4, pp. 155-165.

1044. The Display of the Blue-Backed Manakin, *Chiroxiphia pareola,* in Tobago, W.I. D. W. Snow. *Zoologica,* Vol. 48, Part 4, pp. 167-176.

1045. The Genetics of Mimicry. P. M. Sheppard. *Proc. XVI Int. Congr. Zool. Washington,* Vol. 4, pp. 150-156, 1963.

1046. Experimental Studies and New Evidence on the Evolution of Mimicry in Butterflies. Jane Van Zandt Brower. *Proc. XVI Int. Congr. Zool. Washington,* Vol. 4, pp. 156-161, 1963.

1047. The "Downy" Nestling Plumage of Swifts of the Genus *Cypseloides.* Charles T. Collins. *Condor,* Vol. 65, No. 4, pp. 324-328, 1963.

1048. Mimetic Multilocus Polymorphism in South American Butterflies *(Heliconius* spp.) (Lepidoptera, Nymphalidae). John R. G. Turner. *Proc. XI Int. Congr. Genetics, The Netherlands,* Vol. 1, p. 146, 1963.

1049. The Generation of Ultrasonic Signals by a New World Arctiid Moth. A. D. Blest, T. S. Collett & J. D. Pye. *Proc. Royal Society, B,* Vol. 158, pp. 196-207, 1963.

1050. The Fishing Bats of Trinidad. D. R. Griffin. *Animal Kingdom,* Vol. 66, pp. 152-158, 1963.

1051. Annual Report of the Department of Tropical Research for 1962.

PUBLICATION AND PHOTOGRAPHY

William Bridges, *Curator*

Dorothy Reville, *Editorial Assistant*

Sam Dunton, *Photographer*

Henry M. Lester, *Photographic Consultant*

In part reflecting the broad interests of the Zoological Society in conservation and research, the Society's magazine *Animal Kingdom* perceptibly enlarged its authorship base in 1963. As the most constant and perhaps the strongest single link between the Society and our Membership, it is natural that most of its major articles should be written by members of the staff and should deal with the immediate affairs of the Society, the Zoological Park and the Aquarium. But the Society's concerns extend far beyond the fences around those two institutions and, more and more, *Animal Kingdom's* articles explore fields far from the Bronx and Coney Island. Last year 13 of 31 major articles in the magazine were written by "outside" authors; ten years ago the proportion was 8 out of 29. The subject matter, of course, does not change; it is, as the name of the magazine implies, the animal kingdom.

In the photographic section Mr. Dunton produced two films: "One Summer Day at the Zoo," 18 minutes, color, descriptive of a typical day's operation of the Zoological Park, and an 11-minute color film on the year's activities at the Aquarium. He turned in 474 still nega-

tives, mostly on animals in the collection of the Zoological Park and the Aquarium. Hasselblad and Nikkorex cameras were added to the photographic equipment.

In preparation for the 1964-65 World's Fair, Mrs. Reville designed two displays panels 20 feet by 7½ feet for Zoological Park and Aquarium displays in the New York City Building, and redesigned 4-page folders about the Zoo and the Aquarium for distribution at the Fair.

The original edition of "The Physiology of the Pituitary Gland of Fishes," by Grace E. Pickford and James W. Atz, first published by the Society in 1957, was exhausted during the year and a facsimile reprint was published to meet the continuing demand.

Aid was given to Lee S. Crandall, General Curator Emeritus, in the proof-reading of his 784-page book, "The Management of Wild Mammals in Captivity," which the University of Chicago Press will publish in the spring of 1964.

A book by Mr. Bridges, "Animal Adventures in Lands of Ice and Snow," was published by Whitman.

MEMBERSHIP

GORDON CUYLER, *Membership Chairman*

A GROWING MEMBERSHIP is a good indication of the vitality and strength of the Society. Six hundred and fifty-nine new Members enrolled in 1963 to give a net increase of 278 and a year's-end total of 4,592. New Memberships and changes to higher categories resulted in an income increase of about 11% over 1962.

Members are gained by the Society chiefly through direct mail appeals. One of the most successful of these was the Zoo and Aquarium Newsletter written by Mr. Bridges during the newspaper strike. Other mailings were an attractive announcement of Spring events at the Zoo and Aquarium and a Newsletter about Lemurs by Dr. Alison Bishop.

Two events in the Membership year, designed to hold and encourage the interest of Members in the Society, were the spectacular Annual Meeting in January at the Waldorf-Astoria and the charming Garden Party at the Zoo in June. In addition, five Curator-conducted tours of the Zoo and Aquarium were scheduled for Members and all were well attended.

THE CONSERVATION FOUNDATION

The 1963 Annual Report of the Conservation Foundation, the affiliate of the New York Zoological Society in conservation work, may be had upon request from the Foundation's offices at 30 East 40th Street, New York 16, N. Y.

JACKSON HOLE BIOLOGICAL RESEARCH STATION

L. Floyd Clarke, *Director*

The Jackson Hole Biological Research Station at Moran, Wyoming, was established by the New York Zoological Society with a series of research studies in 1946, and is now sponsored jointly by the Zoological Society and the University of Wyoming.

The following research projects were conducted at the Station during the summer of 1963:

Margaret Altmann—A comparative study of interspecies communications. Assisted by Steve Martin. Supported by the National Science Foundation.

Kenneth L. Diem and *Garth S. Kennington*—Some aspects of plant and animal distribution as affected by geologic formations. Supported by the New York Zoological Society, National Park Service and University of Wyoming.

Ralph W. Dimmick—Population study of Canada geese in Jackson Hole. Supported by the Wyoming Game and Fish Department.

William C. Edwards—Study of the plant ecology of the willow flats. Supported by the New York Zoological Society.

Douglas B. Houston—An ecological-physiological study of moose.

Webster B. Jones—Study of forty big game and livestock exclosures in northwestern Wyoming. Supported by the Wyoming Natural Resource Board and Wyoming Agricultural Experiment Station.

Michael Kersten and *Warren Schimpff*—A vegetative study of Point Island. Supported by the National Park Service and Olympic Natural History Association in Student Conservation Program.

John Merkle—Ecological investigations at Holly Lake, Teton Mountains. Supported by the National Park Service.

Glenn A. Noble—Stress and parasitism. Assisted by Joseph Choi. Supported by the National Science Foundation.

John H. Rumely—Plant ecological studies in Grand Teton National Park. Supported by the National Park Service.

Gerald Scherba—Social organization among colonies in ants. Assisted by Daniel C. Smith. Supported by the National Science Foundation.

William Thurmond—Melanophore-stimulating substances in Amphibia. Supported by the New York Zoological Society.

Alvin Young—A taxonomic study by chemical differentiation of the Genus *Artemisia*. Supported by Western Region Research.

FINANCIAL STATEMENTS

EXHIBIT A

NEW YORK ZOOLOGICAL SOCIETY

BALANCE SHEET • December 31, 1963

ASSETS

Cash		$ 330,181.99
Investments (quoted market value $11,226,866.14)		8,963,586.08
Receivables:		
City of New York	$ 369,633.13	
Other	29,594.06	399,227.19
Inventories, at cost:		
Park facilities	24,550.70	
Aquarium	11,964.82	36,515.52
Facilities' assets, at cost less depreciation:		
Zoological Park (note I):		
Improvements to land and buildings	320,477.03	
Equipment and miscellaneous items	52,624.46	
	373,101.49	
Aquarium equipment and miscellaneous items	12,678.97	385,780.46
Prepaid expenses and deferred charges		23,136.20
National collection of heads and horns, art gallery, library and sundry items	at nominal amounts	1.00
Collection of living animals		1.00
Jackson Hole Research Station buildings		1.00
Simla Tropical Research Station		1.00
		$10,138,431.44

LIABILITIES AND FUNDS

Accounts payable and accrued expenses		149,430.13
Payable to the City of New York		23,625.17
Funds:		
Endowment funds—principal nonexpendable (Exhibit C)	2,053,036.27	
Funds functioning as endowment—principal expendable (Exhibit C)	5,163,869.85	
General funds (Exhibit D)	2,368,845.83	
Special purpose funds (Exhibit E)	379,624.19	
		9,965,376.14
		$10,138,431.44

See accompanying notes to financial statements.

STATEMENT OF INCOME, EXPENDITURES AND APPROPRIATIONS

Year ended December 31, 1963

Income:	*Gross*	*Costs*	*Net*
Investments—interest and dividends	$ 386,530.23	—	386,530.23
Annual dues	86,709.20	—	86,709.20
Gifts for operations	25,141.03	—	25,141.03
Portion of special purpose grants for operating costs	19,252.73	—	19,252.73
Sales of publications and photographs	7,611.82	—	7,611.82
Other	29,910.58	—	29,910.58
	555,155.59	—	555,155.59
Transfer from special purpose funds	594,079.11	—	594,079.11
Zoological Park:			
Operations and maintenance (3)	1,102,472.54(1)	1,290,391.92	(187,919.38)
Facilities	1,288,625.02	1,076,978.59	211,646.43
New York Aquarium:			
Operations and maintenance	216,170.65(2)	302,356.56	(86,185.91)
Facilities	142,393.37	89,742.89	52,650.48
Total	$3,898,896.28	2,759,469.96	1,139,426.32

Expenditures:		
Zoological Park improvements	$ 231,530.43	
Research	248,786.76	
Purchase of living animals	85,926.40	
Conservation of natural resources and animal life	80,996.33	
Education	45,277.27	
Publications	73,408.54	
Membership	38,506.50	
Executive	53,436.92	
Employee benefits	95,746.45	
Other	50,960.94	
Total expenditures		1,004,576.54
Excess of income over expenditures		134,849.78
Appropriations to special purpose funds		222,107.17
Net change for year		(87,257.39)*
Distributed as follows:		
General working fund	(91,973.08)	
General development fund	(7,930.74)	
Park facilities operating fund	12,646.43	$ (87,257.39)

* See net increase in funds on Exhibit D.

(1) Provided by the City of New York.

(2) Includes $82,680.50 provided by the City of New York and the balance substantially from admissions.

(3) Admission fees to Zoological Park added directly to special purpose funds.

See accompanying notes to financial statements.

EXHIBIT C

STATEMENT OF CHANGES IN ENDOWMENT FUNDS AND FUNDS FUNCTIONING AS ENDOWMENT

Year ended December 31, 1963

	Endowment funds	*Funds functioning as endowment*
Balance at beginning of year	$ 2,006,670.72	5,047,233.86
Add net gain on investment transactions	46,365.55	116,635.99
Balance at end of year	$ 2,053,036.27(1)	5,163,869.85

(1) Balance consisting of:

George F. Baker fund	163,663.24
Edward P. Casey fund	122,303.80
Mary Thurston Cockroft fund	57,848.32
Robert Jaffray fund	20,864.66
William Pyle Philips fund	15,384.04
Rockefeller fund	1,513,138.66
Jacob H. Schiff fund	159,833.55
	$2,053,036.27

See accompanying notes to financial statements.

EXHIBIT D

STATEMENT OF CHANGES IN GENERAL FUNDS

Year ended December 31, 1963

		Funds			
	Total	*General Working*	*General Development*	*Park Facilities Operating*	*Aquarium Development*
Balance at beginning of year	$1,507,192.06	137,696.43	902,881.83	466,161.65	452.15
Net gain on investment transactions	23,391.81	2,527.30	20,864.51	—	—
Gifts and legacies	1,095,547.78	—	1,095,547.78	—	—
Distribution of excess expenditures and appropriations over income for year	(87,257.39)	(91,973.08)	(7,930.74)	12,646.43	—
Transfers	(143,913.71) (5)	(33,293.11)	(141,307.44)	—	30,686.84
Direct expenditures	(26,114.72)	—	(17,769.75) (1)	—	(8,344.97) (2)
Balance at end of year	$2,368,845.83	14,957.54	1,852,286.19 (3) (4)	478,808.08	22,794.02

(1) Fund raising expenses of campaign office.

(2) Construction of additional Aquarium facilities and exhibits.

(3) Balance consisting of:

General uses	$1,318,551.70
New York Zoological Park uses only	102,680.00
New York Aquarium uses only	3,410.00
Planting and landscaping in the New York Zoological Park	12,510.74
Scientific purposes only	4,632.46
Marine Biological Laboratory	24,930.95
Wildlife Survival Center	51,755.00
General capital funds	103,215.34
Research Center in the New York Zoological Park	30,000.00
African Plains project	100.00
New York Aquarium Shark Hall	500.00
World of Birds construction	200,000.00
	$1,852,286.19

(4) Not including pledges.

(5) Balance of transfers to special purpose funds.

See accompanying notes to financial statements.

EXHIBIT E

STATEMENT OF CHANGES IN SPECIAL PURPOSE FUNDS

Year ended December 31, 1963

Balance at beginning of year		$ 350,970.18
Additions:		
Net gain on investment transactions	$ 9,374.51	
Gifts and grants:		
U. S. Government	83,287.37	
Other	59,600.77	
Investment income, admission fees, etc.	104,449.59	
Transfers and appropriations:		
Operations	222,107.17	
General funds	143,913.71	622,733.12
		973,703.30
Deduct transfer to income—amount equivalent to expenditures for purposes of the various funds:		
U. S. Government	120,028.28	
Other	474,050.83	594,079.11
Balance at end of year		379,624.19
Consisting of:		
Cadwalader Animal fund	29,860.60	
Conservation account	26,401.74	
William E. Damon fund	52,658.57	
Grant Fund for the Protection of Wildlife	36,965.29	
Stokes Bird fund	7,552.83	
Animal fund	6,665.83	
African Wildlife fund	12,544.82	
Damon Runyon Memorial fund	261.21	
Doris Duke Foundation grant	18,083.81	
Michael Grzimek Memorial fund	21.00	
The John A. Hartford Foundation grant	80,068.83	
Improvement and repair account	5,682.35	
Henry Krumb fund	7,948.25	
Madison Grant Scientific Research fund	85,411.44	
Income from Madison Grant Scientific Research fund	7,257.55	
Park improvement account	494.52	
Special projects	1,745.55	
		$ 379,624.19

See accompanying notes to financial statements.

Notes to Financial Statements

(I) Park facilities' assets are subject to an agreement with the City of New York, and the net income from park facilities' operations may be used only for the purchase of animals and the improvement of Zoological Park.

(II) The balance sheet does not include the assets and liabilities of The Pension Fund.

(III) The New York Zoological Society and the City of New York have agreed to construct an Aquarium, as funds become available, at an estimated total cost (to be shared equally) of $7,100,000.00, of which the initial stage ($1,565,134.00) was completed May 31, 1957.

(IV) The Society and the City of New York have agreed to construct a new Aquatic Bird House at the New York Zoological Park at an estimated total cost (to be shared in a 25/75 ratio) of $481,600.00. At December 31, 1963 disbursements totaled $410,362.89, of which the Society's share was $102,590.73.

PEAT, MARWICK, MITCHELL & CO.
CERTIFIED PUBLIC ACCOUNTANTS
Seventy Pine Street
New York, N. Y. 10005

ACCOUNTANTS' REPORT

THE BOARD OF TRUSTEES
NEW YORK ZOOLOGICAL SOCIETY:

We have examined the balance sheet of New York Zoological Society as of December 31, 1963 and the related statements of income, expenditures and appropriations and changes in fund balances for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. It was not practicable to confirm the receivable from the City of New York by communication with it, but we satisfied ourselves as to the account by means of other auditing procedures. As to gifts, grants and legacies, it was not practicable because of their nature to extend the examination beyond accounting, on a test basis, for the receipts as recorded.

In our opinion, the accompanying balance sheet and statements of income, expenditures and appropriations and changes in fund balances present fairly the financial position of New York Zoological Society at December 31, 1963 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

PEAT, MARWICK, MITCHELL & CO.

New York, N. Y.
February 24, 1964

THE PENSION FUND

(Founded by Andrew Carnegie)
Statement of Cash Transactions
Year ended December 31, 1963

Balance at beginning of year:			
Investments (quoted market value $2,500,714.93)			$2,083,979.15
Uninvested balance of cash			67,878.57
Accrued interest purchased			94.44
			2,151,952.16
Receipts:			
Income from investments:			
Interest		$ 44,770.47	
Dividends		61,830.62	
		106,601.09	
Contributions by employees:			
Regular	$ 50,024.18		
Special	261.54	50,285.72	
Contributions by New York Zoological Society:			
Society	51,534.56		
Facilities	12,883.67		
Aquarium	11,010.55	75,428.78	
			232,315.59
			2,384,267.75
Expenditures:			
Refunds on account of resignations		8,381.03	
Pension disbursements		55,224.05	
Payments to heirs of deceased members		3,749.56	
			67,354.64
			2,316,913.11
Net gain on investment transactions			76,850.65

	Value			
	Market	Book		
Balance at end of year:				
Investments:				
Bonds	$1,288,796.26	1,310,733.82		
Preferred stocks	222,042.50	229,344.73		
Common stocks	1,348,157.05	813,328.44		
	$2,858,995.81		2,353,406.99	
Accrued interest purchased			213.75	
Uninvested balance of cash			40,143.02	
				$2,393,763.76

PERMANENT WILD LIFE PROTECTION FUND

December 31, 1963

ACCOUNTANTS' REPORT

The Board of Trustees
New York Zoological Society:

We have examined the statement of Principal Fund of the Permanent Wild Life Protection Fund for the year ended December 31, 1963, set forth below:

Amount due from New York Zoological Society		$ 3,467.06
Investments, at book value (quoted market value $237,597.12)		198,968.12
Amount of Fund at beginning of year	$ 188,376.50	
Add gain on investment transactions	14,058.68	
Principal Fund at end of year		$ 202,435.18

Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In accordance with the agreement establishing this Fund, the income from the investments of $9,597.45 was paid over to the New York Zoological Society to be used for the specific purposes set forth in such agreement.

In our opinion, the above statement of Principal Fund presents fairly the financial position of the Permanent Wild Life Protection Fund at December 31, 1963, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year. Also, in our opinion, the accompanying schedule is stated fairly in all material respects when considered in conjunction with the statement of Principal Fund.

Peat, Marwick, Mitchell & Co.

New York, N. Y.
February 18, 1964

SUMMARY OF EXPENDITURES, 1896 to 1963, New York Zoological Society and the City of New York, on Account of the Development and Maintenance of the Zoological Park and the Aquarium, Including the Purchase of Collections and Also for the Scientific and General Purposes of This Society.

	EXPENDED BY THE CITY OF NEW YORK			FROM GATE RECEIPTS		EXPENDED BY THE NEW YORK ZOOLOGICAL SOCIETY									
Year	Zoological Park Maintenance	Aquarium Maintenance	Bond Issues a/c Park & Aquarium	Construction and Repairs	Purchase of Animals	Zoological Park Development	Aquarium Improvements	Zoological Park Maintenance	Aquarium Maintenance	Purchase of Animals	Aquarium Specimens	Heads and Horns Collection	Pension Fund Contribution	Library and Paintings	Scientific and General Purposes
1896	.....	.....	.....	.....	.....	$ 4,213.63	.....	.....	.....	.....	.....	.....	.....	.....	.....
1897	.....	.....	.....	.....	.....	6,424.61	.....	.....	.....	.....	.....	.....	.....	.....	$ 2,903.74
1898	.....	.....	.....	.....	.....	23,597.80	.....	$ 1,292.16	.....	.....	.....	.....	.....	.....	4,339.26
1899	$ 30,000.00	.....	.....	.....	.....	145,495.80	.....	7,038.61	.....	$ 8,540.72	.....	.....	.....	$ 102.76	3,476.02
1900	40,000.00	.....	$125,000.00	.....	$ 2,470.88	34,626.24	.....	6,189.33	.....	3,784.32	.....	.....	.....	88.13	5,601.78
1901	65,000.00	.....	300,000.00	.....	2,998.80	18,348.61	.....	3,714.37	.....	11,652.24	.....	.....	.....	462.20	7,597.16
1902	85,000.00	$ 5,959.97	250,000.00	.....	4,256.50	5,908.69	.....	2,757.57	.....	20,983.07	.....	.....	.....	224.73	11,068.69
1903	104,965.00	46,453.68	280,000.00	.....	5,912.95	1,038.20	.....	.....	.....	20,361.62	.....	.....	.....	456.03	13,608.10
1904	104,965.00	46,439.72	315,000.00	.....	5,421.90	1,013.87	.....	1,894.37	.....	14,299.61	.....	.....	.....	887.16	15,072.84
1905	134,965.00	44,968.50	275,000.00	.....	6,849.00	144.00	.....	.....	.....	20,643.40	.....	.....	.....	418.10	18,773.90
1906	144,965.00	44,987.71	250,000.00	.....	8,132.35	778.48	.....	.....	.....	14,907.36	.....	.....	.....	319.16	17,961.67
1907	141,558.75	44,183.87	100,000.00	.....	8,248.65	370.72	.....	.....	.....	10,606.03	.....	$ 892.71	.....	644.05	15,999.68
1908	154,627.00	44,157.27	65,000.00	.....	9,446.40	232.27	.....	.....	.....	4,231.61	.....	735.77	.....	1,313.87	14,693.92
1909	162,325.00	45,971.44	10,000.00	.....	9,992.75	2,860.92	.....	.....	.....	9,734.43	.....	7,340.82	.....	609.56	17,168.95
1910	167,632.00	45,974.86	89,500.00	.....	9,909.90	5,918.35	.....	.....	.....	4,339.25	$ 973.90	2,036.39	.....	1,021.87	20,627.77
1911	174,632.00	47,560.21	155,000.00	.....	11,611.15	1,155.00	.....	.....	.....	6,659.89	1,191.80	1,615.38	.....	1,221.26	23,409.39
1912	182,365.00	46,597.08	.....	.....	11,838.40	40.00	.....	.....	.....	22,750.18	1,350.03	556.94	.....	1,031.55	32,109.01
1913	191,925.00	47,335.62	29,100.00	.....	12,404.25	218.45	.....	.....	.....	10,665.57	1,850.25	486.00	.....	732.97	32,543.88
1914	200,000.00	46,995.53	.....	$ 9,237.81	3,831.15	2,175.13	.....	.....	.....	22,590.44	1,792.99	338.73	$3,333.33	3,541.15	28,240.42
1915	200,000.00	46,991.66	21,425.00	9,175.86	.....	887.88	.....	.....	.....	13,629.41	1,466.64	1,024.91	8,000.00	4,181.24	31,398.08
1916	197,074.35	46,996.43	.....	9,599.81	.....	425.30	.....	.....	.....	13,511.12	2,193.57	1,031.47	8,000.00	1,555.12	38,339.99
1917	199,560.00	46,903.61	.....	3,488.31	7,118.90	1,450.05	.....	11,537.79	.....	10,175.70	1,637.15	18.12	8,000.00	2,869.20	44,262.48
1918	207,586.00	48,630.71	.....	2,642.70	.....	48.12	.....	1,580.00	$ 93.61	8,425.92	960.19	18.61	8,000.00	3,559.85	34,125.49
1919	190,000.00	45,000.00	5,000.00	4,917.84	.....	.....	$ 3,450.00	19,924.00	407.07	13,345.59	1,028.05	88.27	8,000.00	1,442.07	45,599.71
1920	250,098.27	53,971.48	15,000.00	17,438.28	.....	5,007.00	4,095.03	5,141.92	.....	32,761.08	1,654.02	263.86	8,000.00	2,517.64	51,018.20
1921	276,951.01	65,203.12	86,000.00	25,463.77	.....	88,734.92	53,635.02	6,068.17	976.47	27,442.59	2,165.05	2,661.67	8,000.00	4,698.24	55,684.15
1922	264,618.05	63,341.26	25,000.00	17,660.00	.....	50,888.65	16,153.03	10,074.88	3,326.28	43,047.41	3,057.91	7,191.93	8,000.00	1,765.78	58,797.69
1923	262,724.50	57,166.63	.....	18,388.20	.....	5,000.00	.....	19,019.09	3,319.44	24,456.20	1,432.89	1,550.69	8,000.00	3,391.96	58,404.21
1924	262,471.01	57,319.20	7,970.00	16,806.00	.....	.....	28,233.45	28,956.34	8,097.14	11,560.62	2,013.88	942.34	8,000.00	1,938.77	76,559.41
1925	262,808.69	58,324.89	85,000.00	19,974.05	.....	.....	.....	38,793.01	4,380.45	20,843.01	2,609.55	667.78	8,000.00	1,174.24	242,753.89
1926	273,815.12	62,266.20	1,500.00	20,102.90	.....	.....	.....	45,467.10	7,261.21	23,460.04	2,847.35	306.32	8,000.00	562.40	87,915.27
1927	276,855.19	65,216.89	.....	18,960.48	.....	.....	1,395.00	61,968.22	11,656.97	27,545.92	2,861.55	135.00	8,000.00	2,477.37	82,807.54
1928	319,380.50	88,109.12	.....	18,106.25	.....	2,480.06	.....	52,676.35	10,776.84	21,001.88	2,912.97	107.89	8,000.00	1,168.15	88,794.37
1929	338,359.00	71,229.35	100,000.00	21,957.80	.....	13,095.54	984.85	59,673.38	13,670.81	23,783.69	3,572.14	669.48	8,000.00	4,029.63	122,774.78
1930	350,170.92	81,343.46	50,000.00	20,831.91	.....	2,500.89	375.00	65,660.39	16,966.30	17,492.92	1,355.56	639.01	10,000.00	2,726.37	134,278.88
1931	349,344.95	76,408.08	.....	14,890.58	.....	5,131.68	.....	65,601.03	19,541.40	24,439.56	3,650.58	1,707.40	10,000.00	6,713.26	128,871.12
1932	337,490.01	76,071.24	.....	16,710.25	.....	1,852.40	.....	61,127.48	19,155.01	20,039.28	1,934.84	335.00	10,000.00	3,607.97	97,303.32
1933	268,633.38	67,814.24	5,422.63	13,961.02	.....	.....	.....	62,996.66	18,120.73	7,644.14	2,199.91	118.65	10,000.00	3,384.38	86,757.06
1934	257,423.08	65,806.61	.....	11,025.88	.....	1,037.19	.....	66,502.59	18,229.23	9,267.86	1,641.06	162.86	10,000.00	606.53	81,711.26
1935	265,630.94	68,203.46	.....	11,596.51	.....	.....	.....	66,237.94	18,832.57	16,530.28	2,031.56	275.21	10,000.60	383.07	82,929.14
1936	265,057.37	68,760.95	.....	13,496.42	.....	100.00	.....	57,270.94	17,886.45	20,918.46	2,867.50	178.43	10,000.00	470.18	79,835.73
1937	267,192.29	73,807.74	.....	11,527.85	.....	.....	.....	56,262.45	16,408.55	22,417.08	2,799.17	24.79	19,047.09	1,415.39	92,609.40
1938	282,759.71	79,225.20	.....	10,235.70	.....	.....	.....	57,043.10	13,408.11	15,351.51	558.82	.....	20,455.95	431.41	93,543.59
1939	283,280.81	79,164.23	.....	11,019.23	.....	.....	.....	51,050.57	12,941.70	23,012.27	403.75	175.00	20,475.95	345.30	92,576.90
1940	282,761.15	78,905.12	.....	8,392.10	.....	102,343.87	.....	57,513.25	12,022.76	39,627.52	577.10	.....	20,069.17	533.85	98,501.09
1941	286,284.59	62,052.95	.....	15,947.33	.....	187,408.02	.....	84,254.19	9,466.70	57,236.77	574.40	.....	18,206.34	1,316.89	100,846.55
1942	258,656.76	50,931.00	.....	10,169.20	.....	43,088.43	.....	49,226.40	4,807.79	8,369.36	553.52	.....	10,762.57	401.65	144,765.21
1943	305,203.23	33,324.31	.....	11,961.80	.....	38,860.03	3,500.00	51,833.51	5,154.21	2,319.36	336.19	.....	9,832.98	574.01	73,192.91
1944	315,787.82	33,790.82	.....	17,316.09	.....	32,101.60	23,420.00	50,691.82	3,717.28	5,100.59	96.48	.....	10,234.06	405.52	88,594.55
1945	334,288.37	38,158.81	.....	20,745.35	.....	58,943.48	225.52	58,846.39	5,928.38	11,466.19	460.34	.....	12,681.89	1,001.92	112,541.29
1946	366,113.74	42,654.03	.....	24,688.34	.....	122,388.48	*34,997.55	62,439.25	6,742.70	43,037.09	172.30	.....	14,238.14	741.14	168,881.41
1947	440,147.60	40,285.04	.....	22,665.64	.....	101,392.86	*19,669.26	85,294.53	8,715.67	71,342.79	687.91	.....	15,751.26	690.03	348,442.82
1948	469,638.83	38,564.40	.....	30,690.08	.....	93,683.84	116.71	83,652.16	9,419.90	26,461.29	470.63	.....	16,708.48	1,004.40	346,222.76
1949	497,900.12	40,189.02	.....	25,400.02	.....	344,122.56	*4,203.50	82,044.22	11,170.76	50,408.80	1,370.90	.....	31,251.50	1,220.17	333,513.75
1950	506,035.90	40,188.48	.....	23,731.77	.....	62,598.22	.....	85,411.22	11,404.61	22,947.59	767.71	.....	35,049.90	970.52	298,458.78
1951	553,918.55	42,774.35	.....	28,913.22	.....	69,747.69	.....	94,063.94	12,966.97	17,934.34	613.19	.....	17,936.21	1,365.34	271,570.10
1952	579,931.76	45,809.54	.....	27,588.02	.....	40,542.32	.....	105,641.48	13,721.06	18,806.08	665.69	.....	18,938.55	1,618.36	335,393.47
1953	632,546.60	45,756.46	.....	27,666.78	.....	218,810.05	*9,123.67	97,757.81	14,329.34	28,470.18	468.74	.....	21,806.69	796.59	369,159.64
1954	639,084.84	48,606.34	.....	28,008.91	.....	76,808.53	*746,130.99	100,743.77	14,291.04	22,247.80	781.88	.....	22,999.30	1,382.30	297,882.02
1955	650,172.61	49,049.83	.....	30,615.05	.....	56,213.34	*88,350.00	102,401.35	13,761.57	28,859.77	782.74	.....	23,293.09	6,093.43	321,406.32
1956	738,263.33	36,516.95	.....	29,900.00	.....	61,385.97	*21,768.31	109,039.58	18,175.44	29,141.48	287.81	.....	27,806.41	5,301.83	311,250.88
1957	784,753.54	17,703.99	.....	32,801.54	.....	85,464.03	*161,899.38	128,980.29	185,230.53	23,589.69	139.03	.....	27,423.24	1,857.10	332,630.13
1958	798,532.65	.....	.....	46,659.74	.....	376,298.11	*41,170.39	139,660.77	240,990.37	39,780.98	14,172.54	.....	28,694.95	1,076.32	382,337.62
1959	835,272.07	..	.....	68,143.83	.....	83,458.41	*348,862.21	163,468.19	254,768.29	50,114.74	12,182.41	18,699.35	30,991.74	1,137.16	424,997.44
1960	871,681.49	.....	.....	71,415.34	.....	51,626.87	*55,557.66	153,678.84	284,261.16	24,585.13	11,446.68	3,105.00	33,567.36	1,856.65	475,279.66
1961	993,091.56	10,000.00	.....	56,330.35	.....	75,816.23	*247,988.25	168,809.55	297,264.01	43,690.40	26,600.50	.....	39,333.26	1,157.15	567,455.96
1962	1,065,315.48	35,312.94	.....	62,485.03	.....	89,228.94	101,788.38	175,495.68	315,587.77	74,061.29	8,174.47	.....	40,407.70	1,683.33	609,257.35
1963	1,102,472.51	82,680.50	.....	71,708.21	.....	159,822.22	8,344.97	187,919.38	215,126.04	67,806.73	22,669.69	.....	51,534.56	2,221.09	651,133.81
Add Premium on Bonds, less Balances Reverting to the City			35,559.89												
Expended in Connection with Preparation and Publication of "A Monograph of the Pheasants" – Gift of Col. Anthony R. Kuser															194,100.00
Expended in Connection with Galapagos Expedition – Gift of Harrison Williams															98,670.00
Transfer by the Society for Endowment for Pension Fund–July 1, 1941													239,523.45		
Totals	23,102,068.03	3,084,116.10	2,681,477.52	1,161,908.15	120,443.93	3,065,354.49	2,025,428.13	3,466,327.38	2,204,480.69	1,506,265.24	164,067.48	56,101.81	1,078,355.12	106,899.82	10,071,339.90
		$28,867,661.65			$1,282,352.08				$23,744,620.06						

* Includes expenditures in respect of new aquarium.

NEW YORK ZOOLOGICAL SOCIETY

Incorporation of the New York Zoological Society by the State of New York was accomplished under Chapter 435 of the Laws of 1895 and the basic purposes of the Society were embodied in Section 2:

> Said corporation shall have power to establish, maintain and control zoological parks, gardens, or other collections for the promotion of zoology and kindred subjects, and for the instruction and recreation of the people. Said corporation may collect, hold and expend funds for zoological research and publication, for the protection of wild animal life, and for kindred purposes, and may promote, form, and co-operate with other associations with similar purposes, and may purchase, sell, or exchange animals, plants, and specimens appropriate to the objects for which it was created.

Subsequently, at a special meeting of the Commissioners of the Sinking Fund, City of New York, held on March 24, 1897, a resolution was passed allotting South Bronx Park for the use of the New York Zoological Society and establishing the terms of a management agreement under which the Society has operated since that date, with only minor modifications.

The resolution of March 24, 1897, and the supplemental agreement of January 24, 1942, provided that the Society should furnish the original equipment of buildings and animals, that it should raise $250,000 by subscription within three years of the date of starting work on the improvement of the grounds, that the Society should have the right to establish an endowment fund to be used solely for the general uses and purposes of the Society unless otherwise specified by the donors, that the City of New York should provide funds for the maintenance and care of the Zoological Park and for the maintenance of the animal collections, that the Zoological Park should be open to the public free at least four days a week, that the Society may expend the net proceeds of facilities only for the purchase of animals and the improvement of the Zoological Park and that the Society should have the right to make and control all appointments of employees and to fix salaries and make promotions.

NEW YORK ZOOLOGICAL SOCIETY

Organized 1895

Presidents

I. Andrew H. Green ..... 1895 to 1897
II. Levi P. Morton ..... 1897 to 1909
III. Henry Fairfield Osborn ..... 1909 to 1925
IV. Madison Grant ..... 1925 to 1937
V. W. Redmond Cross ..... 1937 to 1940
VI. Fairfield Osborn 1940

First Vice-presidents

I. J. Hampton Robb ..... 1895 to 1897
II. Henry Fairfield Osborn ..... 1897 to 1909
III. Samuel Thorne ..... 1909 to 1916
IV. Madison Grant ..... 1916 to 1925
V. Frank K. Sturgis ..... 1925 to 1932
VI. W. Redmond Cross ..... 1932 to 1937
VII. Kermit Roosevelt ..... 1937 to 1939
VIII. Alfred Ely ..... 1939 to 1959
IX. Laurance S. Rockefeller 1959

Second Vice-presidents

I. Charles E. Whitehead ..... 1895 to 1902
II. John L. Cadwalader ..... 1902 to 1915
III. Madison Grant ..... 1915 to 1916
IV. Frank K. Sturgis ..... 1916 to 1925
V. Henry D. Whiton ..... 1925 to 1930
VI. Kermit Roosevelt ..... 1930 to 1937
VII. Alfred Ely ..... 1937 to 1939
VIII. Laurance S. Rockefeller ..... 1939 to 1959

Honorary Vice-president

I. DeForest Grant ..... 1957 to 1960

Treasurers

I. L. V. F. Randolph ..... 1895 to 1901
II. Charles T. Barney ..... 1901 to 1903
III. Percy Rivington Pyne ..... 1903 to 1922
IV. Cornelius R. Agnew ..... 1922 to 1953
V. David Hunter McAlpin 1953

Secretaries

I. Madison Grant ..... 1895 to 1925
II. William White Niles ..... 1925 to 1935
III. Fairfield Osborn ..... 1935 to 1940
IV. Harold J. O'Connell ..... 1941 to 1959
V. G. W. Merck 1959

Chairmen, Executive Committee

I. Charles E. Whitehead ..... 1895 to 1896
II. Henry Fairfield Osborn ..... 1896 to 1903
III. Charles T. Barney ..... 1903 to 1907
IV. Henry Fairfield Osborn ..... 1907 to 1909
V. Madison Grant ..... 1909 to 1937
VI. W. Redmond Cross ..... 1937 to 1940
VII. Laurance S. Rockefeller ..... 1940 to 1943
VIII. Fairfield Osborn ..... 1943 to 1945
IX. Laurance S. Rockefeller 1945

Directors

I. William T. Hornaday
Zoological Park ..... 1896 to 1926
II. Charles H. Townsend
New York Aquarium ..... 1902 to 1937
III. W. Reid Blair
Zoological Park ..... 1926 to 1940
IV. Allyn R. Jennings
Zoological Park ..... 1940 to 1941
V. Charles M. Breder, Jr.
New York Aquarium ..... 1937 to 1943
VI. John Tee-Van
Zoological Park ..... 1952 to 1956
General Director, Zoological Park & Aquarium . 1956 to 1962
VII. Christopher W. Coates
New York Aquarium 1956
VIII. James A. Oliver
Zoological Park ..... 1958 to 1959
IX. William G. Conway
Zoological Park 1961

BOARD OF TRUSTEES

City of New York
Ex-officio

Hon. Robert F. Wagner, *The Mayor*
Hon. Newbold Morris, *Commissioner of Parks*

Class of 1964

Alexander Aldrich
George F. Baker, Jr.
John Elliott
Robert I. Gannon, S. J.
Peter Grimm
Fairfield Osborn
Eben Pyne
Laurance S. Rockefeller
John M. Schiff
Henry Sears
Joseph A. Thomas
Robert Winthrop

Class of 1965

A. Raymond Dochez
Charles W. Engelhard
Peter Gimbel
Robert G. Goelet
John N. Irwin, II
Warren Kinney
Harold J. O'Connell
Howard Phipps, Jr.
John Pierrepont
Chauncey Stillman
Landon K. Thorne

Class of 1966

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William R. Coe
C. Suydam Cutting
Childs Frick
Henry Clay Frick
Otto Marx, Jr.
David Hunter McAlpin
G. W. Merck
Richard C. Patterson, Jr.
John H. Phipps
Alfred G. Vanderbilt

OFFICERS OF THE SOCIETY

Fairfield Osborn, *President*

Laurance S. Rockefeller, *First Vice-president*

G. W. Merck, *Secretary*

David Hunter McAlpin, *Treasurer*

Eben Pyne, *Assistant Treasurer*

General Office: 630 Fifth Avenue, New York 20, N. Y.

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Laurance S. Rockefeller, *Chairman*

George F. Baker, Jr.
John Elliott
Henry Clay Frick
Peter Gimbel
Robert G. Goelet
John N. Irwin, II
David Hunter McAlpin, *ex-officio*
G. W. Merck, *ex-officio*
Newbold Morris, *ex-officio*
Harold J. O'Connell
Fairfield Osborn, *ex-officio*

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Fairfield Osborn, *Chairman*

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William G. Conway
Charles Driscoll
Warren Kinney
David Hunter McAlpin
G. W. Merck
John Pierrepont
Eben Pyne
Herbert F. Schiemann
William Souhrada

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Eli Whitney Debevoise
B. Danforth Ely

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G. W. Merck
Fairfield Osborn, *ex-officio*
Eben Pyne
John M. Schiff

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G. W. Merck, *ex-officio*
Fairfield Osborn, *ex-officio*

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Christopher W. Coates
William G. Conway
Lee S. Crandall
Joseph A. Davis, Jr.
Herndon G. Dowling
Ross F. Nigrelli

HEADS AND HORNS COMMITTEE

Laurance S. Rockefeller
John Tee-Van
Samuel B. Webb
F. Carrington Weems

STAFF

John Tee-Van, *General Director, Emeritus, Zoological Park and Aquarium*

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William G. Conway, *Director & Curator, Birds*
Joseph A. Davis, Jr., *Curator, Mammals*
Roland Lindemann, *Consultant in Mammal Management*
Joseph Bell, *Assistant Curator, Birds*
Grace Davall, *Assistant Curator, Mammals & Birds*
Herndon G. Dowling, *Curator, Reptiles*
Charles P. Gandal, *Veterinarian*
Gordon Cuyler, *Membership Chairman & Administrative Associate*
Herbert J. Knobloch, *Associate Curator, Education*
Jerry M. Johnson, *Designer, Exhibition*
Charles B. Driscoll, *Superintendent, Operations*
Edward Kearney, *Manager, Facilities Department*
Lee S. Crandall, *General Curator Emeritus*

AQUARIUM

Christopher W. Coates, *Director*
Paul Montreuil, *Curator*
Carleton Ray, *Associate Curator*
Ross F. Nigrelli, *Director of Research & Pathologist*
Klaus D. Kallman, *Geneticist*
Jewell Bungay, *Business Manager*
Aage Olsen, *Superintendent*
Morris H. Baslow, *Research Associate in Physiology*
C. M. Breder, Jr., *Research Associate in Ichthyology*
Harry A. Charipper, *Research Associate in Histology*
Sophie Jakowska, *Research Associate in Experimental Biology*
Louis Mowbray, *Research Associate in Field Biology*
Martin F. Stempien, Jr., *Research Associate in Bio-Organic Chemistry*

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Jocelyn Crane, *Director*

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Jane Van Z. Brower
Lincoln P. Brower
William G. Conway
Julie C. Emsley
Michael G. Emsley
William K. Gregory
Donald R. Griffin
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John Tee-Van

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Walter Lerchenfeld, *Assistant Comptroller*
John McKew, *Personnel Manager*
William Bridges, *Editor & Curator, Publications*
Dorothy Reville, *Editorial Assistant*
Sam Dunton, *Photographer*
Henry M. Lester, *Photographic Consultant*
William H. Eddy, Jr., *Associate in Education*
Alison Bishop, *Research Associate*

AFFILIATES

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Fairfield Osborn

President
Samuel H. Ordway, Jr.

Senior Vice-president
Laurance S. Rockefeller

Vice-presidents
George E. Brewer, Jr.
F. Fraser Darling

Secretary
William Vogt

Treasurer
David Hunter McAlpin

Executive Officer
Wallace D. Bowman

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Noel D. Eichhorn
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Katherine Higbee
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Martha Munzer
Hugh J. Ross
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JACKSON HOLE BIOLOGICAL RESEARCH STATION

Under the Sponsorship of The New York Zoological Society and The University of Wyoming

Director
L. Floyd Clarke

FELLOWS OF THE NEW YORK ZOOLOGICAL SOCIETY

Allen, Arthur A.
Amadon, Dean
Anable, Mrs. Anthony
Anthony, H. E.
Antopol, William
Aronson, Lester R.
Atz, James W.
Beach, Frank A.
Bogert, Charles M.
Boyden, Alan
Breder, C. M., Jr.
Brown, M. Vertner
Carpenter, C. R.
Carter, T. Donald
Cazier, Mont A.
Chapin, James P.
Charipper, H. A.
Clark, James L.
Clarke, L. Floyd
Coates, Christopher W.
Colbert, Edwin H.
Conant, Roger
Conway, William
Coolidge, Harold J.
Cousteau, Jacques-Yves
Cox, Richard T.
Crandall, Lee S.
Crane, Jocelyn
Curran, C. H.
Delacour, Jean
Dochez, A. Raymond
Dowling, Herndon G.
Elton, Charles
Emerson, Alfred E.
Enders, Robert K.
Fleming, Henry
Frick, Childs
Gandal, Charles P.
Gertsch, W. J.
Goodwin, George G.
Gorbman, Aubrey
Goss, Leonard J.
Gregory, William K.
Haskins, Caryl P.
Hatt, Robert Torrens
Jakowska, Sophie
Kazimiroff, Theodore
LaMonte, Francesca R.
Lloyd, Hoyes
McClure, Gervase W.
Mayr, Ernst
Merriman, Daniel
Mettler, Fred A.
Murphy, Robert Cushman
Nachmansohn, David
Nicholas, John S.
Nigrelli, Ross F.
Oliver, James A.
Parr, Albert Eide
Pearson, J. F. W.
Peterson, Roger Tory
Phelps, William H.
Ponder, Eric
Pope, Clifford H.
Riess, Bernard F.
Ripley, S. Dillon, 2nd
Schneirla, T. C.
Schroeder, Charles R.
Scott, J. Paul
Seth-Smith, David
Simon, James R.
Stunkard, Horace W.
Tee-Van, John
Vogt, William
Wallach, Jacques

MEMBERSHIP IN THE NEW YORK ZOOLOGICAL SOCIETY

The New York Zoological Society was founded in 1895 for the "instruction and recreation of the people" through the establishment of a Zoological Park, for the promotion of zoology through exhibition of collections, publications, research and exploration, and for the conservation of animal life of the world. Since 1899 the Zoological Society has directed the New York Zoological Park and in 1902 it was entrusted with the management of the New York Aquarium.

Membership is actively invited of all persons who are interested in the objects of the Society and desire to contribute toward its support.

Annual Membership is $15. Contributing Membership is $25. Supporting Membership is $100. These Memberships entitle the holders to Member's cards for admission (including parking) to the Zoological Park on pay days, and 5 to the Aquarium on any day; a copy of the *Annual Report;* a subscription to *Animal Kingdom,* the bi-monthly publication of the Society; privileges of the Library and Members' Lounge in the Administration Building of the Zoological Park and to attend all open meetings of the Society. Tickets to all sections of the Zoological Park for which an admission charge is made are available, free, to Members upon application at the Administration Building in person. Members will be taken on "behind the scenes" tours of the Zoological Park and Aquarium, without charge, on application, and are entitled to 20% discount on all publications of the Society. We are advised that Contributing and Supporting Membership fees are deductible from income tax within the legal limits.

Life Membership is $500. See By-laws for conversion of Annual, Contributing and Supporting to Life Membership. Other classes of membership are: Patron, $1,000; Associate Founder, $2,500; Founder, $5,000; Founder in Perpetuity, $10,000; Benefactor, $25,000.

Applications for membership may be submitted to any officer of the Society at the Zoological Park or the Aquarium, or to the Society's general office at 630 Fifth Avenue, New York 20, N. Y.

FORM OF BEQUEST

I do hereby give and bequeath to the "New York Zoological Society," of the City of New York.....

.....

(Gifts to the New York Zoological Society are now tax deductible up to 30% of adjusted gross income).

Summary of Membership

December 31, 1963

Benefactors	22
Founders in Perpetuity	14
Founders	16
Associate Founders	21
Patrons	65
Life Members	345
Supporting Members	143
Contributing Members	1,451
Annual Members	2,427
Fellows	75
Research Associates	3
Corresponding Members	4
Honorary Members	6
Total	4,592